Marine Review

THE BUSINESS OF TRANSPORTATION BY WATER

NEW YORK **CLEVELAND** LONDON

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Your Guide To this Issue

Enforceable Laws

WE HAVE laws to aid our merchant marine but the executive judgment is against enforcement. Could not enforceable laws be passed?

See Page 11

Cargo Transfer

RIVER transportation depends upon the development of efficient terminals for cargo transfer. A new type, now under construction, is illustrated and described.

See Page 13

Fire Menace

RULES and regulations for detecting and extinguishing fire on board ship should be complete and specific. In this article recommendations are made after careful study.

See Page 15

Canadian Drydock

THE second largest graving dock in the world has been completed by the Canadian government and is ready for commercial business at Esquimalt, Victoria, B. C.

See Page 16

Oil Separators

DISCHARGE of oily bilge and ballast water is prohibited in territorial waters. British engineers survey the development of practical oil separators. The subject is fully discussed with illustrations.

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Philadelphia Piers

PHILADELPHIA has pursued a vigorous policy of pier development. The port has a reputation for handling heavy cargo economically and business is steadily increasing.

See Page 27

The Oxygen Factor in Engineering Design

THE oxy-acetylene process has made it possible to accomplish many things with metals. Plant equipment can be made more compact and simple. Production costs can be reduced. Machines can be constructed that were formerly out of the question.

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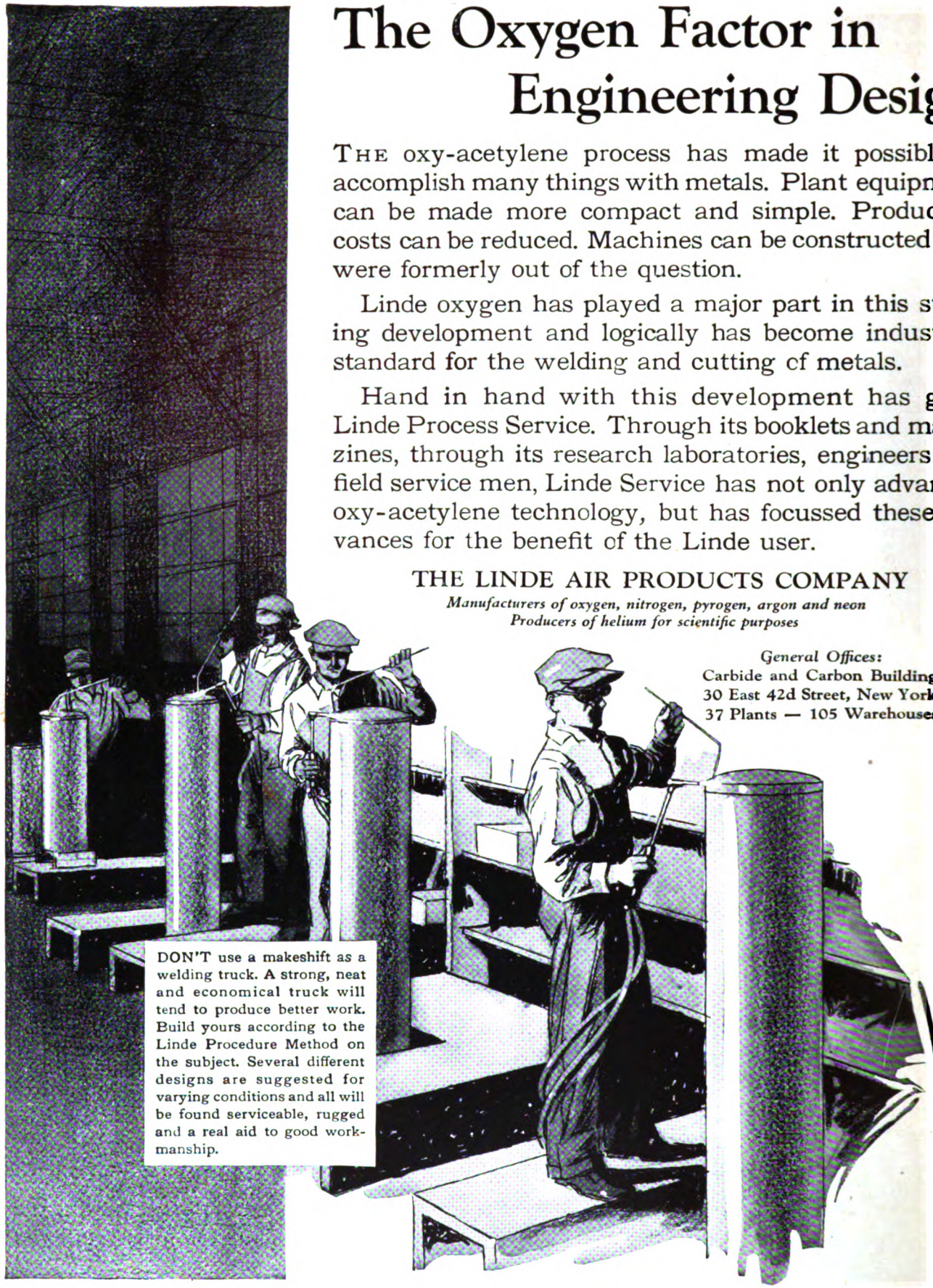

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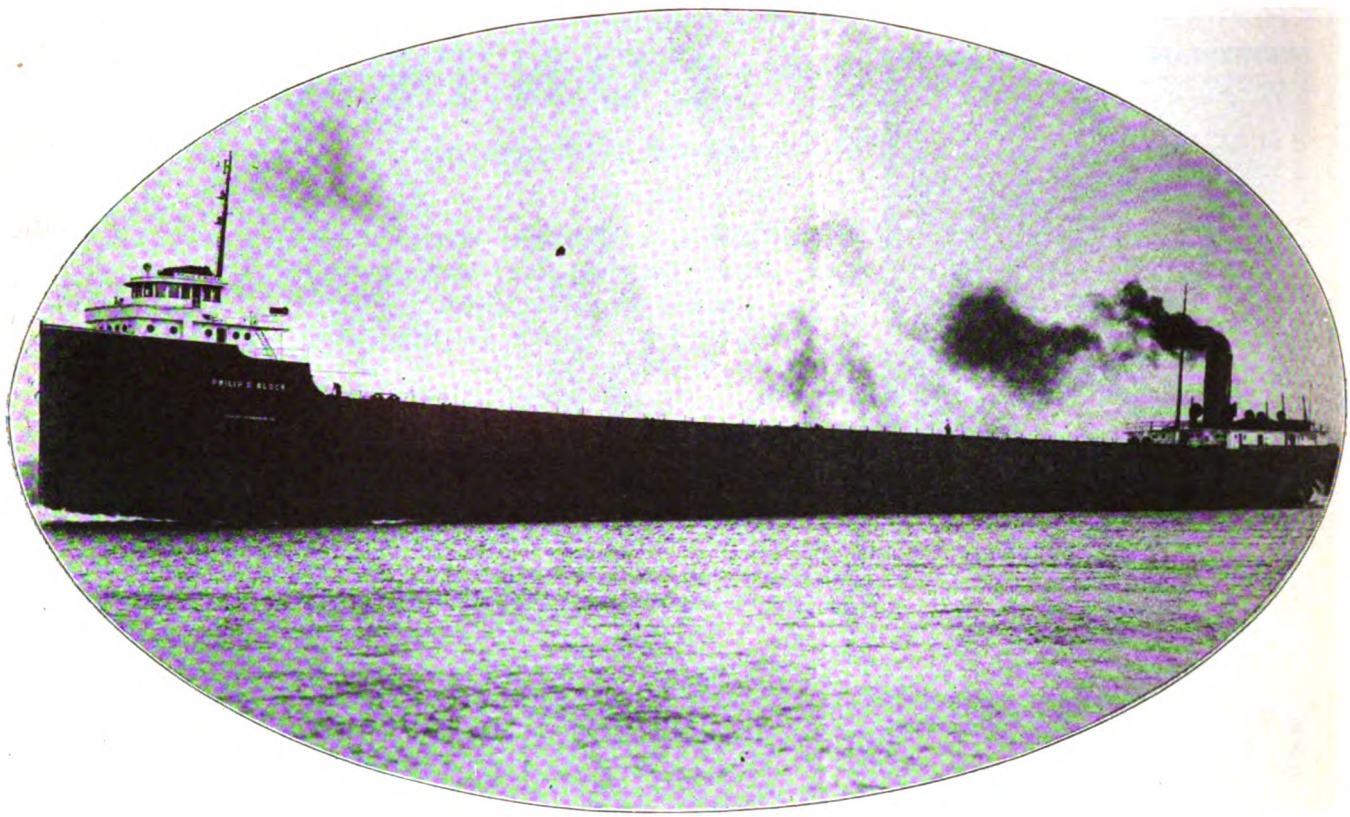
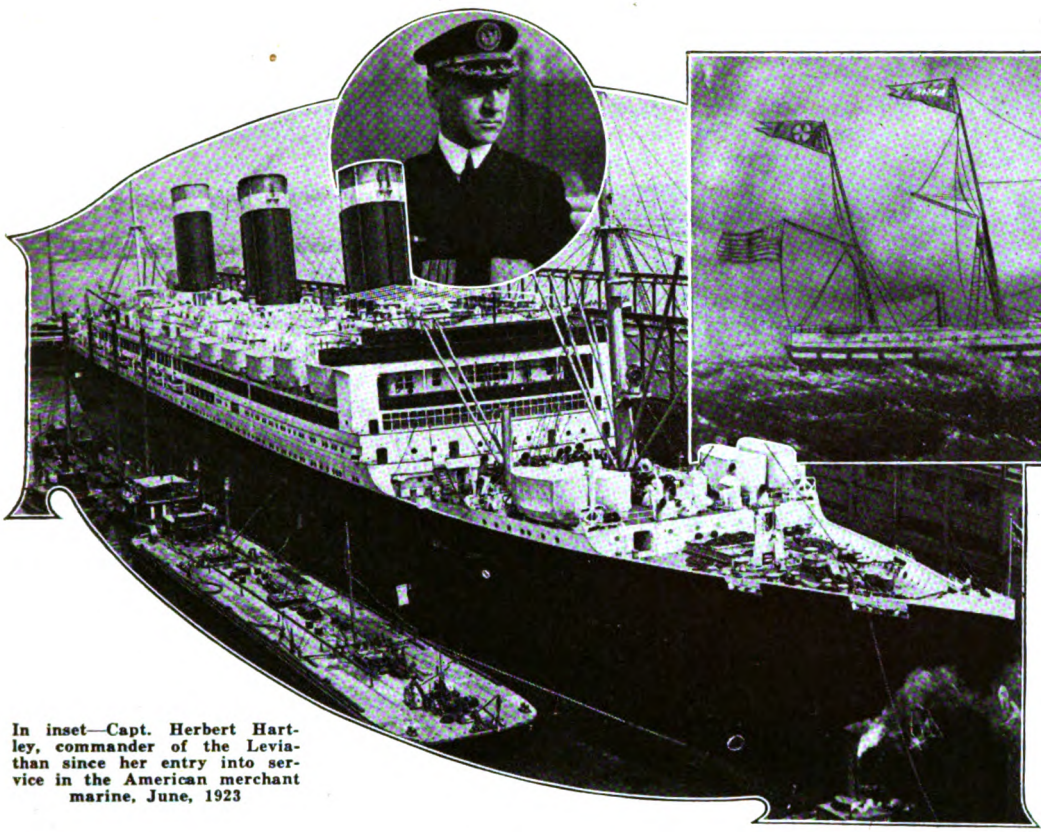
The American Ship



S. S. PHILIP D. BLOCK



In inset—Capt. Herbert Hartley, commander of the Leviathan since her entry into service in the American merchant marine, June, 1923

Above—Bangor, first iron seagoing propeller steamer in the United States. Built by the Harlan and Hollingsworth Co., Wilmington, Del., in 1843-4. When bought by the government, renamed Scourge

At left—S. S. Leviathan, though built in Germany, was elaborately rebuilt, rearranged and redecorated in the American manner. Conceded the equal of any foreign liner

What Can Be Done To Build Up a Merchant Marine?

MANY shipping authorities and tariff experts contend that the early American merchant marine was considerably helped and encouraged by the preferential tariffs which were allowed to goods imported into the United States in American bottoms and some of these authorities are of the opinion that if the same preferential tariffs were in effect today that the American merchant marine would be considerably benefited.

Early Colonial Laws Aided Shipping

History records that in most of the American colonies before the Revolution there were distinctive enactments designed to aid shipping. Of these the earliest was passed in Virginia in 1631, twenty years before the date of the English navigation act. In most of the colonial charters discriminating duties were authorized. That of Virginia was typical, with a duty of 2½ per cent on all goods imported by British subjects and 5 per cent on all goods imported by foreigners.

Government statistics show that in 1789 of the 600,000 tons of shipping engaged in the foreign and domestic trade of the United States, 400,000 was American and 200,000 foreign, of which three-fourths was British. Although the coastwise trade was not exclusively confined to American vessels until 1817, few foreign vessels could participate in it after 1789. The statutes of 1789 provided for discriminating duties 10 per cent below the general tariff rates when the goods were brought into the country in American-owned vessels. A tonnage duty of 6 cents per ton was levied on American-owned vessels, 30 cents per ton on American built but foreign owned vessels, and 50 cents per ton on foreign built and foreign owned vessels.

It is the contention of those who have made a study of conditions at that time that the prosperous condition of the American merchant marine was due in large part to these preferential tariffs.

Difference in Import Duties Effective

In addition to this discrimination, the act of 1789 gave the maximum protection to American trade engaged in the Orient. An import duty ranging from 6 to 20 cents per pound was laid on tea imported direct from India or China when shipped in American bottoms. When exported from Europe to the United States in American vessels the rates ranged from 8 to 26 cents per pound. The duties on tea shipped in foreign vessels ranged from 15 cents to 45 cents per pound. All other oriental products carried to

the United States in foreign bottoms bore a duty of 12½ per cent ad valorem, which was about double the rates imposed on the corresponding goods imported in American vessels.

Duties were greatly increased by the tariff act of 1790, but a notable change in the latter was the substitution of a 10 per cent addition to the general rates on goods imported in foreign vessels, instead of the 10 per cent discount on American vessels as in the act of 1789.

Foreign Vessels Pay Extra Tax

In 1804 a so-called "light-money act" was passed, imposing an extra tonnage duty of 50 cents per ton on all vessels other than American. This was increased to $1.50 per ton in 1812. While this levy was ostensibly for the purpose of keeping up the lighthouses, its effect was to levy a duty of 90 cents per ton more on a foreign than an American ship. The dissatisfaction with the wording of the Jay treaty of 1794, which was designed to permit England to impose discriminations on American ships equal to those imposed in the United States on British ships, brought about a proposal for the repeal of discriminating duties, for the British countervailing duties operated particularly against this country's foreign exports to England, tobacco and fish oil. These sections of the Jay treaty remained in force till 1807.

In 1815 came the great change from discrimination to reciprocity, congress in that year repealing the discriminating duties against foreign nations on imports, and discriminating tonnage taxes on any cargo of their own production brought by their vessels, on condition that such reciprocal measures were adopted by the foreign government; that is, reciprocity was established for the direct but not for the indirect trade. The benefit of this reciprocity was extended to Great Britain by the treaty of July, 1815, exempting the West Indies from its provisions. In March, 1817, congress passed an act designed to compel the nations carrying on indirect trade to enter into reciprocity agreements with the United States by forbidding the importation of goods from any foreign port except in American vessels or vessels of the country from which the goods came, unless such foreign country imposed no such prohibition against American shipping.

The French also attempted to gain a monopoly of French commerce with the United States by imposing prohibitive duties on American produces unless carried in French vessels. Accordingly, congress, by an act approved May, 15, 1820, levied an additional tonnage duty of $18 per ton upon all French vessels, entering American ports until they should accept the American offer of reciprocity. On May 24, 1828, congress passed the important reciprocity bill, offering reciprocity both in the direct and indirect trades. Advantage was taken of this offer by some 40 countries, and there are about 32 treaties still in effect at this time.

The policy of exempting from additional tariff duties the cargoes of vessels belonging to such foreign countries as granted corresponding favors to the goods carried in American ships continued until the merchant marine act of 1920. The intervening tariff laws generally contained a section imposing additional 10 per cent duties on goods imported in foreign vessels, exempting treaty nations from the provision. By this restriction, of course, the surtax of 10 per cent became practically unimportant, for all the principal navigating powers had concluded treaties. A further discriminating duty of 10 per cent was sometimes imposed on imported merchandise coming from any port or place east of the Cape of Good Hope in foreign ships, subject, however, to the usual treaty exemptions.

In addition to the discriminating provisions already mentionad there has been also in all recent tariffs, a provision that "no goods, wares or merchandise, unless in cases provided for by the treaty, shall be imported into the United States from any port or place, except in vessels that truly and wholly belong to the citizens or subjects of the country of which the goods are the growth, production, or manufacture, and from which such goods, wares, or merchandise, can only be, or most usually are, first shipped for transportation." The penalty for violation of this provision is forfeiture of vessel, cargo, tackle, etc. In the tariff act of 1913, also, there was an additional duty clause, granting a discount of 5 per cent on goods imported in American vessels, subject to the treaty exemptions. After different constructions by the court of customs appeals and the attorney general, the United States Supreme Court finally held this provision to have been without significance by reason of the existence of the treaties. This decision doubtless led to the enactment of section 34 of the Jones act of 1920, which provided for the denunciation of treaties preventing discriminations.

The subject of the renewal of discriminations as a policy was discussed by numerous congressional committees, notably in 1905 by the Gallinger committee, which reported adversely to the reintroduction of discriminating duties as a policy.

The principal reason why the majority of the Gallinger committee of 1905 opposed the return to discriminating duties was not the fear of retaliation of American vessels, for at that time there were very few American ships to which this retaliation could be applied. There was first, the fear that foreign governments would shape their retaliation against United States export trade in general by discriminating duties against the exports of agriculture and manufactures and, second, and more particularly, the large free list in the United States tariff, covering almost one half the foreign commodities consumed in the United States.

Rise and Fall of Shipping

The growth of the American merchant marine in foreign trade from 1789 to 1861 and its decline thereafter down to 1901 are illustrated in the following brief statement found in Bates's American Navigation.

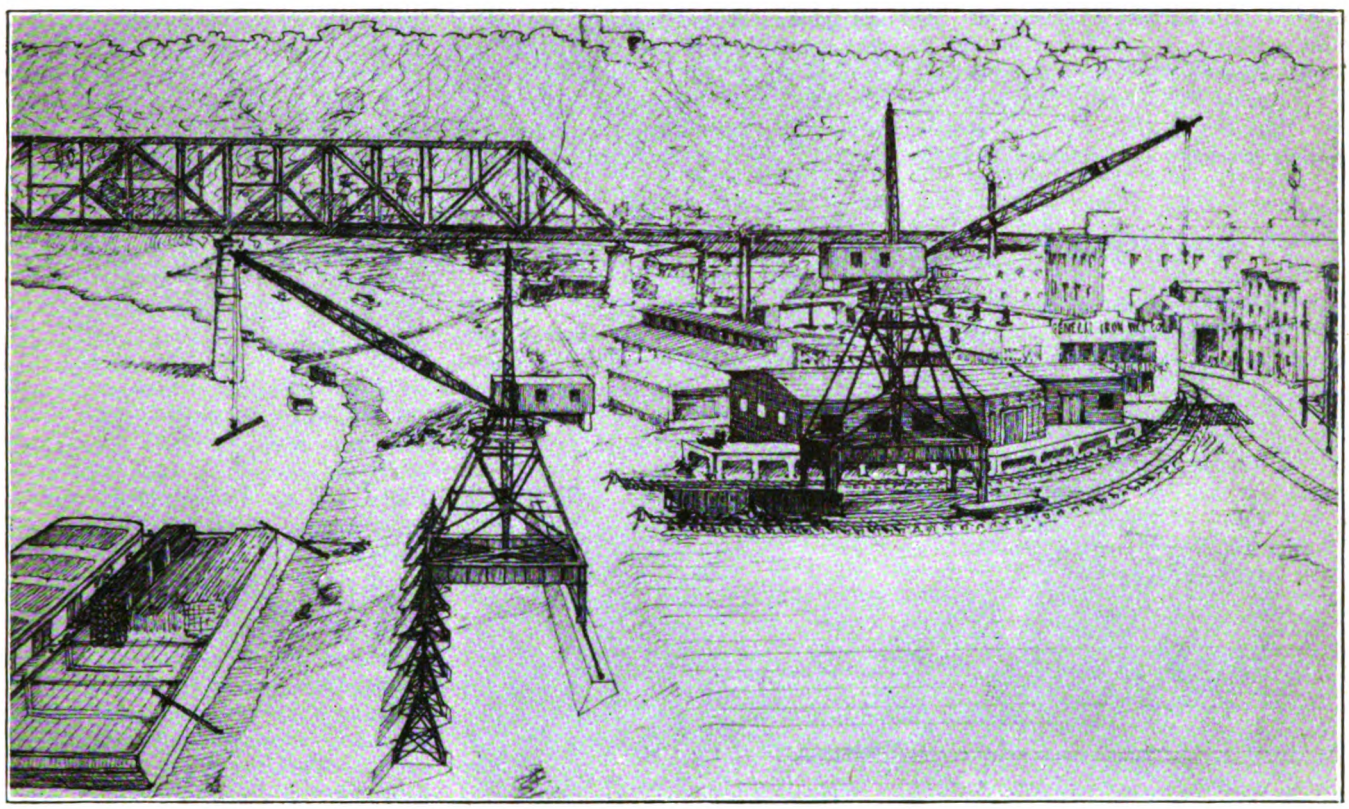
"Beginning with 20 per cent or less of proportionate carriage in 1789, in a few years our vessels were carrying from 80 to 90 per cent of our export and imports, the culmination occuring in 1826, when the figures stood—for exports, 89.6 per cent; for imports, 95 per cent. By 1861—a period of 35 years— export carriage had fallen to 72.1 per cent, import carriage to 60 per cent. By the close of the war the figures were down to 26.1 per cent and 29.9 per cent for exports and import carriage, respectively. For 1901 the proportion stood at 6.13 per cent for export carriage and 11.99 per cent for import. Once American shipping did three-fourths of our transportation with Europe. In 1900 a treasury officer thus reports:

"In the trade between the United States and Europe this year not one American vessel went to or came from Germany, Russia, Sweden and Norway, Denmark, the Netherlands, Italy, Austria, Hungary, Greece, or Turkey.

"Two small American vessels came to the United States from France, one in ballast. One American sailing vessel came from Belgium in ballast and one American vessel cleared for Spain. There cleared for or entered from the United Kingdom 11 American sailing vessels, and 2 small steam vessels went to the United Kingdom in ballast. The American flag was never before such a rarity on the North Atlantic between the United States

(*Continued on Page* 40)

New River Terminal For Quick Cargo Transfer



An Artist's Drawing Showing the River-Rail Terminal Now Under Construction on the Ohio River at Cincinnati

CINCINNATI will be the first city on the Ohio river to be equipped with a modern river-rail terminal. A project, which is designed to transfer bulk and heavy commodities from river barges to railroad cars and motor trucks, is now under construction in that city and it is expected will be completed and in operation by Oct. 1 of this year.

The construction of this terminal marks the culmination of a movement inaugurated by the Cincinnati chamber of commerce in 1922. At that time a committee of business men was appointed to investigate ways and means for providing Cincinnati with facilities to enable its shippers and receivers of freight to utilize the Ohio river as a means of transportation. The committee reported in 1923 recommending that the chamber of commerce foster and promote a corporation to undertake the construction of a river-rail terminal. The Cincinnati River-Rail Transfer Co. was an outgrowth of this recommendation. The members of the committee acted as sponsors of the enterprise which was incorporated under the laws of Ohio in 1923. Approximately $100,000 of the stock of this corporation has been subscribed by local business and industrial concerns as well as prominent citizens of the community. A number of civic organizations including the chamber of commerce, Commonwealth club and the Cincinnatus association have contributed to the successful outcome of the project.

Electrically Operated Cranes

The terminal was designed by Major Bert L. Baldwin, a consulting engineer of Cincinnati. As shown in the accompanying illustration, the plan provides for the erection of an electric crane of the pintle type on an elevated track constructed on the river bank at a point approximately midway between the low water mark and the top of the river bank. This crane will swing in a radius of 100 feet and will be capable of lifting a load of ten tons out of a barge and directly into a railroad car located on the top of the bank. During a working day of 10 hours this crane will be capable of transferring approximately 500 tons or the equivalent of 12 carloads. A similar crane will be erected on the top of the bank so that it can reach any part of the property in order to place material in storage as well as to load additional cars and motor trucks. Three private railroad sidings will be constructed on the property furnishing a combined capacity for 15 cars at one time. A concrete loading platform will extend the entire length of one of the tracks for the loading and unloading of box cars.

The terminal is being constructed on a plot of ground owned by the Terminal company and adjacent to the main line of the Baltimore & Ohio railroad. The site is higher than the general elevation of the river bank and will be subject to flood only during periods of extreme high water such as prevailed during 1913.

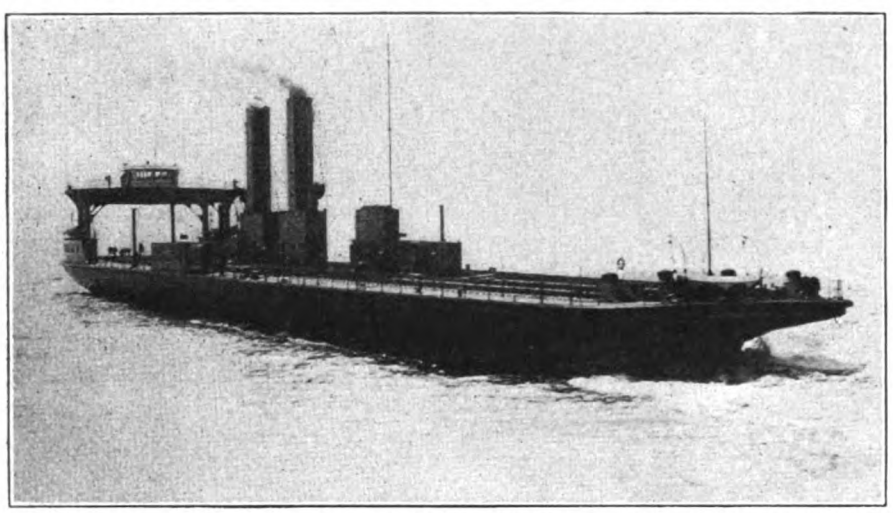
The pintle cranes were purchased from the United States engineers department at Florence, Ala., where they had been used in the construction of the Wilson dam. They were originally manufactured by the McMyler Interstate Co. of Bedford. O.

The officers of the Cincinnati River Rail Transfer Co. to whom the credit of accomplishment is due are: Julian A. Pollak, vice president of the Pollak Steel Co.; Capt. Oscar F. Barrett, owner of the Barrett Barge line; former Mayor George Puchta, president of the Queen City Supply Co.; George D. Crabbs, president of the Philip Carey Mfg. Co.; Eshelby F. Lunken, president of the Lunkenheimer Co.; Harold W. Nichols, president of the Fox Paper Co., and George W. Breiel, manager of the industrial department of the Cincinnati chamber of commerce.

In addition to package freight, the Cincinnati terminal will be particularly well adapted for the handling of steel, pig iron, cement and other bulk commodities which are being transported on the Ohio river in increasing volume at the present time. With the completion of the Ohio river improvement in 1929, it is believed that the Ohio will become an important medium of transportation, and the construction of the Cincinnati River-Rail terminal is merely a forerunner of what will eventually constitute a complete chain from Pittsburgh to Cairo, Ill. More than 15,000,000 tons of various commodities were transported on the Ohio in 1925. This amount represents an increase of 5,000,000 tons or 50 per cent over the corresponding tonnage transported in 1924. Statistics for the first six months of 1926 show an increase of 2,000,000 tons over a corresponding period for the previous year. It is apparent that terminal facilities are needed.

Powerful Steel Carferry Is Completed

A NEW steel carferry called MANITOWOC has recently been placed in service, between Detroit and Windsor, by the Wabash Railway Co. This vessel was built by the Manitowoc Shipbuilding Corp. and at the request of J. E. Taussig, president of the Wabash company, the vessel was named MANITOWOC. Its length is 370 feet, beam 65 feet and depth 21 feet 6 inches.



RECENTLY COMPLETED STEEL CARFERRY MANITOWOC BUILT BY THE MANITOWOC SHIPBUILDING CORP., MANITOWOC, WIS., FOR THE WABASH RAILWAY CO.

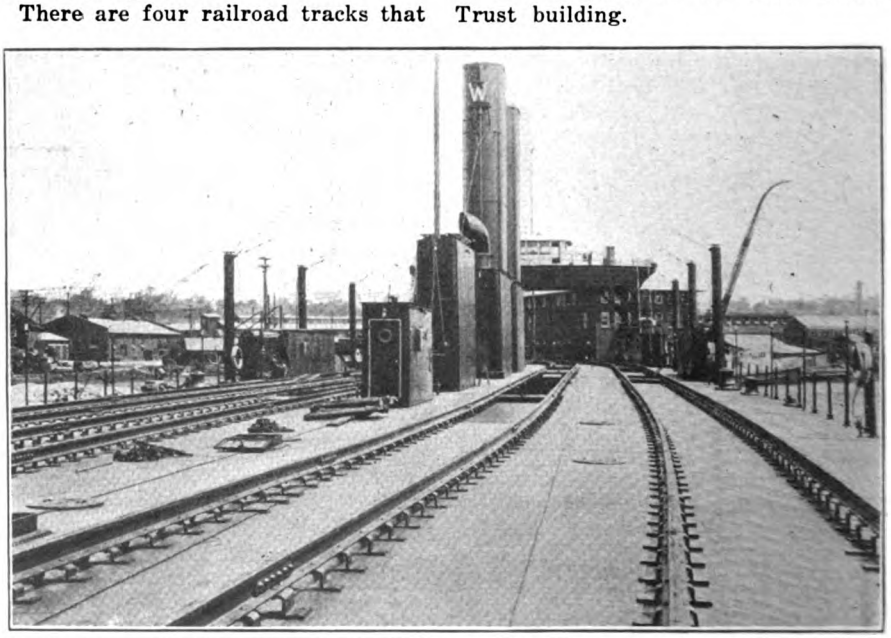
The keel was laid on Dec. 21, 1925 and the vessel launched April 14, 1926. At the launching an elaborate ceremony was held and it was witnessed by many prominent officials of the Wabash Railway Co. and others interested in the railroad and marine fields. The MANITOWOC was completed June 23, 1926 and left immediately for Detroit.

It is equipped with four fore and aft compound marine engines of 1300 horsepower each. Steam is supplied by six scotch marine boilers 13 feet 9 inches diameter, 11 feet 6 inches long, built for 160 pounds working pressure, and designed to burn coal or oil. There are two coal bunkers of 400 tons capacity and oil bunker capacity of 330 tons. The vessel is equipped with four propeller wheels, two at each end, especially designed for use in heavy winter weather and for breaking ice.

There are four railroad tracks that will carry thirty of the largest type of freight cars, also passenger coaches.

There are no kitchen, dining room or sleeping accommodations as none are required. There are three crews, and they work on eight hour shifts.

The ship, was built under the supervision of R. H. Reynolds, marine supentendent of the Ann Arbor Railroad Co.



DECK VIEW OF THE NEW CARFERRY MANITOWOC SHOWING FOUR RAILROAD TRACKS FOR ACCOMMODATION OF CARS

River Towboats Ordered

The Inland Waterways Corp., has accepted the bid of the Dubuque Boat & Boiler Co., Dubuque, Iowa, for constructing three towboats for $125,000 each, for the use of the upper Mississippi barge line between St. Louis and St. Paul and Minneapolis. Six bids were received for the construction of these boats.

Dean Bros. Co. well known for good pumps has established its own direct factory sales and service office at Philadelphia, in the Real Estate Trust building.

Fight Fire Menace on Shipboard

Steamboat Inspection Should Issue Specific and Practical Regulations for Detecting and Extinguishing Fires—Present Rules Too Vague

BY J. S. JONES

FIRE at sea, the most dreaded of all marine catastrophies, was first given official consideration when the American delegation to the international conference on safety of life at sea offered the following resolution:

"That the several states signatory to this conference agree to enact such legislation as will to the fullest possible extent provide for the prevention, detection and extinguishing of fire on shipboard, the details of the installation and application of such law to be regulated and arranged by the several signatory states."

Not until 1916 did the rules of the department of commerce, steamboat inspection service, take official cognizance of this vital subject, when rule IV, applying to ships under American registry was adopted. This rule has remained in force without change up to the present. The progress made in the art of shipbuilding has long since caused this regulation to be inadequate for present day requirements.

Present Rules Not Specific

Rule IV, section 14, of the general rules and regulations prescribed by the board of supervising inspectors, reads:

"All passenger vessels of more than 150 feet in length, whose construction is contracted for after June 30, 1916, which are provided with staterooms or other sleeping quarters for passengers, shall be equipped with an efficient fire alarm system or indicator which will automatically indicate or register at one or more points or stations where it can be most quickly observed by the officers or crew of the vessel, the presence or indication of fire in the staterooms and various other compartments of the vessel which are not accessible to the observation of the officers or crew. . . ."

As this rule is very broad and capable of many interpretations, a number of different types of fire detecting and alarm installations have been made, some of which are of doubtful efficiency and effectiveness. This is evidenced from statistics compiled by the United States coast guard section of the treasury department, which show that from July 1, 1921, to June 20, 1925, there were 701 vessels on fire. Besides the considerable loss of lives, the property value involved was $69,793,950, of which, property to the value of $25,169,770, representing approximately 36 per cent of the total value of the vessels and their cargo was destroyed.

Authorities Study Regulations

Such a tremendous loss of life and property has caused the department of commerce to give further consideration to the question of fire detection and protection of vessels under their cognizance and at the last annual

J. S. JONES

meeting of the board of supervising inspectors, the question of automatic fire alarm detection and protection occupied a prominent place on the schedule of subjects under discussion. Not until the meeting of January, 1926, was the subject gone into comprehensively, and as a result of this meeting the steamboat inspection service now has under contemplation a revision of rule IV, section 14, of the regulations. The following proposed change has been issued by this department for the comments of all interested and concerned in the question of fire detection and protection of ships:

"All passenger steamers shall be equipped with an approved fire alarm system or indicator which will automatically indicate and register, at one or more points or stations where it can be most readily observed by the officers or crew of a vessel, the presence or indication of fire in staterooms, officers' and crew's quarters, cargo and various other compartments of a vessel where fires are liable to occur."

This contemplated change, while more explicit as to the requirements than the previous regulations governing automatic fire alarm systems, more especially in respect to the compartments to be protected, is yet insufficient to insure proper and adequate fire alarm systems being designed and installed for the proper protection of vessels. Likewise, they are sufficiently broad to continue to allow for many interpretations by the various inspectors in the different inspection districts, thereby defeating the object of uniform and efficient equipment and installation practice.

Further Amplification Needed

The proposed rule has not yet been adopted, and it is to be hoped that before adoption it will be amplified sufficiently to permit the shipowner and operator knowing in advance the amount of protection that will be required for the safety of a vessel. There is likewise an economic factor which must be taken into consideration because an owner having a ship built in one inspection district to operate from another, can ill afford to have a fire alarm system which is not acceptable to the department and inspectors in any district from which the ship may operate.

Further, it is essential that uniform practice be established so that construction engineers and equipment manufacturers can properly interpret the department requirements in a way that will be uniformly acceptable.

Under the rule in force at present one of the principal defects is that section of the rules relative to "protection of only compartments not accessible to officers and crew." From a literal interpretation of the law, it appears that lamp rooms, paint lockers, storerooms, linen lockers, life preserver rooms, baggage rooms, and crew's staterooms, being accessible to officers and crew, are therefore not required to have any fire detecting and alarm protection, although rec-

(*Continued on Page* 42)

The author is secretary of the Marine Committee of the American Institute of Electrical Engineers.

Recent Sales of Ships

T. V. O'Connor of the United States Shipping board has announced the following sales of government tonnage:

UNION LIBERTY, LAKE FLAG and LAKE IKATAN, lake type freighters were sold to the Southern Steamship Co. for $25,000 each, cash, with an obligation to perform certain alterations and betterments. These vessels are typical deep draft lake-built, steel vessels of 4095, 4230 and 4208 deadweight tons, respectively, of 1425 indicated horsepower, two scotch boilers, with a speed of 9½ knots on 20½ tons of oil per day. The three vessels at the time of the sale were tied up at Philadelphia and were available for immediate delivery.

HOVEN, HAMPTON ROADS, and CECIL COUNTY, steel tankers. The board approved the form of advertisement submitted by the president of the Fleet corporation calling for sealed bids on the foregoing tankers to be opened at noon, Oct. 12, 1926.

CASTANA, a Hog Island type cargo vessel converted to a bulk oil carrier was sold to the Tankers Corp., N. Y., for the sum of $200,000.

DEUEL, a steel vessel of 8557 deadweight tons, sold to W. R. Grace & Co. at $6.50 per deadweight ton. Title is to be taken by Grace Steamship Co. The S. S. DEUEL was built by J. S. Duthie & Co., in November, 1919, and is equipped with one triple expansion engine of 2520 indicated horsepower and three scotch boilers. Her speed is about 10¼ knots on 33 tons of oil a day. The vessel was at the time of the sale under assignment to the Yankee line, but was laid up at Baltimore. The DEUEL is to be added to the Grace company's fleet operating under sales contract with the shipping board in the service between the west coast of the United States and South America.

DISTRICT OF COLUMBIA, steel tanker authorized for sale for conversion to diesel electric drive.

World Markets

APPALACHEE, single deck steamship, 3767 gross tons, 5350 deadweight tons, for about £10,000 to Italian buyers.

MELPO, single deck steamship, 5222 gross tons, 8000 deadweight tons for about £35,000 to Care & Marquand Shipping Co., Cardiff.

SUREWAY, double deck steamship, 5131 gross tons, 8280 deadweight tons, for about £36,000 to Japanese buyers.

VERENTIA, double deck steamship, 5185 gross tons, 7033 deadweight tons, for about £32,000.

LORD ERSKINE, single deck steamship, 1995 gross tons, 3260 deadweight tons, for about £15,000.

BARFLO, single deck steamship, 1085 deadweight tons, 751 gross tons, for about £9000 to Hijos de Romulo Bosch, Barcelona.

KYAK, single deck steamship, 6410 deadweight tons, 3663 gross tons, for about £9500 to Olivier & Co., London.

NORDSEL, single deck steamship, 6300 deadweight tons, 3771 gross tons, for £13,150 by auction, to N. Kulukundis, Syra.

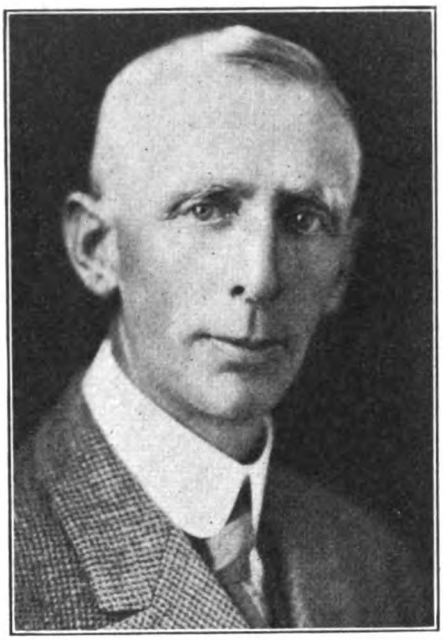
PAYS DE LIEGE, double deck steamship, 5919 gross tons, for about £9500 to Belgian buyers.

Second Largest Dry Dock Is Ready

THE new graving Esquimalt drydock at Esquimalt, located three miles from Victoria, B. C. is now open and available for commercial service to all vessels. This gives Esquimalt two dry-docks at this point. The new dock is a big step in advance for the Canadian government. The dock is the largest of its kind in all the British Empire and the second largest dock in the world being exceeded in size only by the famous Commonwealth dock at Boston.

The dock was designed and constructed by the public works department of Canada, K. M. Cameron, chief engineer for the department and J. P. Forde, district engineer in charge of the work.

The total cost of the development was approximately $6,000,000. The dock is 1150 feet long with a clear width at the entrance over the sills of 126 feet; the width at the top of the dock at the coping level is 149 feet; the depth of the water on the sills at high tide is 40 feet. The area at the bottom of the dock is 142,600 square feet and when the dock is filled it contains 43 million Imperial gallons. With the electrically driven pumps the dock can be emptied in three hours and twenty minutes.

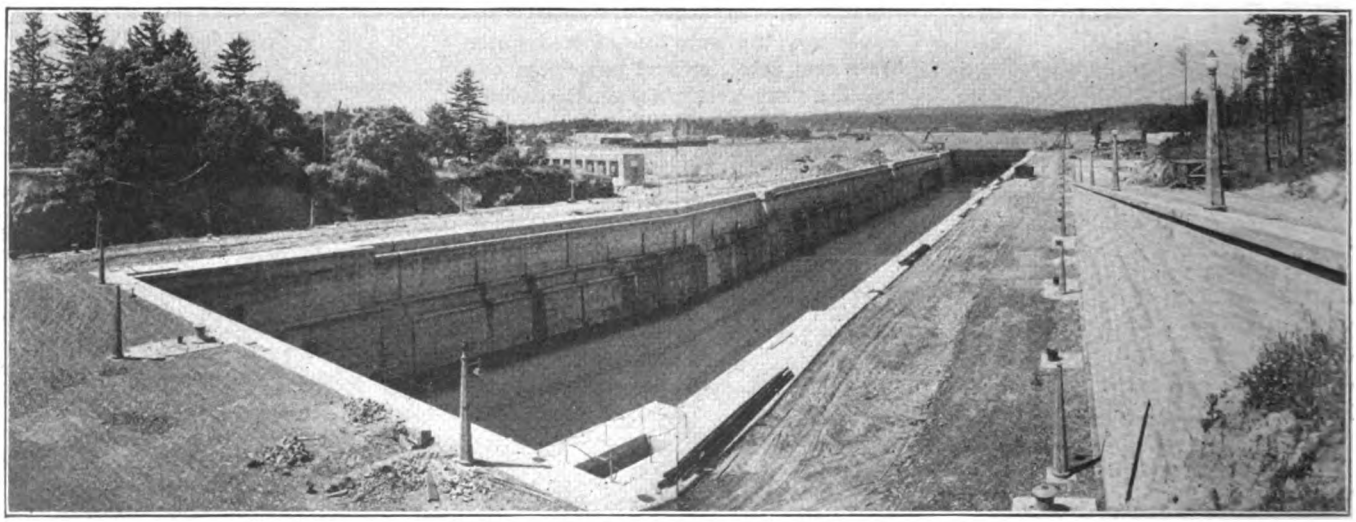


J. P. FORDE, M. E. I. C.
District Engineer in Charge

The dock is designed and is able to accommodate the largest commercial or naval vessel afloat, the design being such that caissons can close the dock into sections, one 400 feet and one 750 feet long to accommodate vessels of varying dimensions, or the full basin of 1150 feet is available.

All equipment around the dock is of the latest and most modern type, being electrically operated. Bollards are amply spaced around the dock and there are nine capstans spaced at different intervals; eight of these capstans electrically operated give a line pull of 25,000 pounds each at a speed

(*Continued on Page* 40)



SECOND LARGEST GRAVING DOCK IN THE WORLD RECENTLY COMPLETED AND PLACED IN COMMISSION BY THE CANADIAN GOVERNMENT AT ESQUIMALT, VICTORIA, B. C.

Determine Initial Stability

How Location of Center of Gravity Is Fixed by Inclining the Ship —Initial Stability in Any Condition Can Then Be Calculated

BY CAPT. CHESTER WILLETT

THE introduction of the inclining experiment by the United States steamboat inspection service for determining the position of the center of gravity of a vessel, from which the metacentric height which is the initial measure of stability may be determined, is a notable triumph in the promotion of safety of life at sea. But before the position of the center of gravity can be determined by an inclining experiment, the displacement, center of buoyancy, and metacentric, radius must be established from the lines of the vessels. For all vessels of any pretentions these quantities have been determined as a part of the necessary calculations in the design.

The primary purpose of an inclining experiment, is to determine the position of the center of gravity of the light ship. The hull and machinery should be complete in every respect and all equipment permanently located All extraneous weights, such as fuel, stores, and fluids of all kinds, except water in the boilers at working level, must be excluded from the vessel in preparation for an inclining experiment.

The metacentric height is the initial measure of the stability and the emergencies encountered by vessels of various characteristics require a certain factor of safety if you like, of which it is a true index. Upon an ocean-going ship, loaded and ready for sea, 20 inches in metacentric height may be considered a good measure for comfort and safety, while an inland steamer with 20 inches in metacentric height may be unsafe. Obviously a standard limit of metacentric height for all vessels cannot be specified by law. With every alteration of displacement, the metacentric height and the behavior of the vessel are affected, and it is dangerous to generalize and it is therefore, necessary to investigate the stability for a variety of conditions. In order for a ship to be successful, she must be economical and dependable in operation, but first of all she must stand up, and possess that quality of resisting a change from rest, which tends to return her to the upright position upon being disturbed and buffeted about by dynamic forces.

There is considerable preparatory work to an inclining experiment in order to conduct the test expeditiously and ensure accuracy of results, and many precautions must be strictly adhered to and sundry details properly arranged. A preliminary inspection is made to ascertain the condition of the vessel and a careful list is made of all items necessary to complete the ship, together with their weights and permanent locations on board. A list is also made of all weights on board to go ashore, such as inclining weights, dunnage, staging, and tools; and of all weights on board but not in their respective positions.

This may be determined with sufficient accuracy by the formula

$$GM = \frac{w \times d}{D \times \tan \theta}$$ and solving for w,

$$w = \frac{GM \times D \times \tan \theta}{d}$$

where w is the amount of inclining weight required, G M is the metacentric height (estimated at a reasonable desired amount), d is the distance the weight or weights can be moved from the center line of the ship, D is the displacement of the ship, and tan θ is the angle of inclination which may be 3 degrees.

The inclining weights may be of any local material suitable for handling transversely over decks and should be divided into any number of equal units and placed on the center line or on the outboard sides of the deck.

Use At Least Two Pendulums

At least two pendulums should be suspended from suitable locations, and on large vessels three pendulums are used. The pendulums are suspended in buckets of oil to dampen their oscillation for the purpose of more accurate readings on a batten, which is prepared on a wooden horse, or trestle, to record the throw or swing of the pendulum when the weights are moved across decks. The pendulum line should be about 15 or 20 feet in length and must pivot from a sharp suspension point so that accurate measurements of the length of the line between the pivot and the batten can be made.

The draft of the vessel is taken from a small boat, where the marks are measured with accuracy and recorded as draft at inclining condition, for use in determining the weight of the ship from the displacement curves.

The density of the water is determined by taking a sample of the water at the surface and a sample from near the depth of the ship amidships, and the mean density accurately determined by analysis, or hydrometer tests, for use in the correction of the weight of the ship as predetermined.

After the preliminary examination, the vessel is put in an upright position. All the necessary measurements and data are taken and recorded, the mooring lines are slackened and all persons on board stationed at their assigned positions on the center line, and the zero readings are marked on the various battens.

After the zero readings have been marked, the inclining weights are moved; the first movement is generally from port to starboard, and the men on board again take up their respective positions on the center line and the first readings are recorded on the battens. In the particular case under discussion here 15.97 tons of weight was moved across decks 36 feet, and the vessel heeled slightly.

On referring to the data sheet, it was found that the draft at the inclining condition was 14 feet 2.5 inches aft and 10 feet 1.125 inches forward. After corrections were made for the base line, they worked out to a mean draft of 12 feet 1.81 inches. The true displacement at the above drafts, with correction for density of water, shell, and appendages, was found to be 4590 tons, which represented the weight of the ship as inclined.

Upon making calculations for the metacentric height, it was found that:

$$GM = \frac{15.97 \times 36}{4590} \times \frac{182.625}{14.44} = 1.60$$ feet

which subtracted from the height of

(*Continued on Page* 62)

The author, Capt. Chester Willett of the United States steamboat inspection service has been in charge of conducting inclining experiments on vessels since the inception of this rule by the government. An article in the September, 1925 issue of MARINE REVIEW treated the general subject.

General Commerce on Great Lakes Broadening

More Dock Facilities Being Provided for Industrial Freight—18,000 Tons of Billets and Strip in Recent Shipments

By A. J. Hain

FURTHER evidence of increasing use of our inland waterways for the shipment of general products is noted in the recent completion of the Pennsylvania railroad commercial dock No. 1 in the Cuyahoga river, Cleveland.

The dock has facilities for transferring freight from a large manufacturing area in Ohio and Pennsylvania to steamers, and for receiving shipments from other Great Lakes ports enroute to cities in Ohio and adjacent states. A number of manufacturers of steel products have made inquiries as to capacity and rates. The dock was built to supply a service for freight to and from the Pittsburgh, Youngstown, Wheeling, Canton, Massillon and Cleveland districts.

Another commercial dock at Cleveland so far this year has handled 18,000 tons of steel products. It received four cargoes of steel billets from Duluth for shipment to a tube mill in Pennsylvania, and four cargoes of strip steel from Buffalo for a Cleveland stamping company. A few days ago it unloaded 2500 tons of sulphur for a Cleveland chemical manufacturer, from barges that brought the cargo from New Jersey, through the New York barge canal.

The difficulty in the way of large shipments of general merchandise between Great Lakes and Atlantic ocean ports is due to the fact that the draft of water in the barge canal is limited to 9 feet, making it impossible to operate larger types of vessels economically, and it is unprofitable to use the smaller craft. Access for ocean ships by way of the St. Lawrence through the Welland canal is greatly hampered by a limiting draft of 14 feet.

Passenger boats plying between Cleveland, Buffalo, Toledo, Chicago and other cities are carrying considerable merchandise including light steel products, but theirs is an overnight, express service and the rates are higher than those of package or bulk freighters.

The total amount of iron ore, coal, grain and limestone handled on the Great Lakes in a normal year is about 110,000,000 tons. Loading and unloading facilities are ample. Records of tonnages are kept at shipping and receiving ports, and are available each month. Complete records are not compiled showing shipments of iron and steel and other metal products, automobiles, machinery and equipment, and general merchandise.

No. Adequate Records Kept

Freight worth millions of dollars is moving every year on the Great Lakes, without any tangible, coordinated compilations. Appeals have been made to chambers of commerce, port officials and transportation companies to organized some means for preparing data that would be of commercial value, but results have been unsatisfactory.

Various associations representing the coal, iron ore, grain and limestone trades know each day practically how the movement of those materials is progressing. Other freight business is growing to such proportions that reliable information will be required soon. Those who desire to improve port and dock facilities must know what is needed, and what they may expect.

It is said certain manufacturers do not want information regarding shipments "broadcast." They take the view it is all right to record the movement of bulk freight such as coal, ore and grain, but beyond that, do not narrow the field. A large steel producer is shipping certain products by way of the Great Lakes to destinations far up in Canada; to name the material, tonnage and destinations would give too much information to competitors. This question has been threshed out before chambers of commerce committees and the reply from those seeking the information has been that general classifications could be made which would give tonnage figures, without disclosing customer information. The debate has been entirely between those who might put capital in dock and vessel facilities, and organizations representing business and civic interests.

This is one of the few services in transportation that have not been carefully analyzed from the tonnage standpoint. It costs less to ship a ton of bulk freight from the head of the lakes to a lower lake port than it does to send it from overland to Pittsburgh. In the movement of general merchandise betwen cities on the Great Lakes, the railroads naturally have sought to get the business rather than have it go to ships. They have provided good facilities, cars and quick service, 12 months in the year. Except where it has not conflicted with their railroad business, their policy certainly has not been one to promote lake commerce. This has contributed to public indifference, an indifference that is amazing when costs are compared. It makes capital hesitate; and it makes the establishment of a new commercial dock seem like an event.

Formerly railroad companies owned and operated freight boats on the Great Lakes, but the decision in the Panama canal case separated the two branches of the service. There have been no complaints of inadequacy of vessel and dock facilities for coal, iron ore and grain, but general merchandise has been allowed to shift for itself; nothing like the system-

atic construction and improvement of the ore, coal and grain docks is noted for other products.

Recognition of this fact led Duluth capitalists to construct a commercial dock at a cost of more than $5,000,000; Detroit has built one costing several million dollars; Chicago is arranging for one, and Buffalo is planning one. Eventually, Cleveland probably will have a large commercial dock on its lake front, sheltered by the present breakwater.

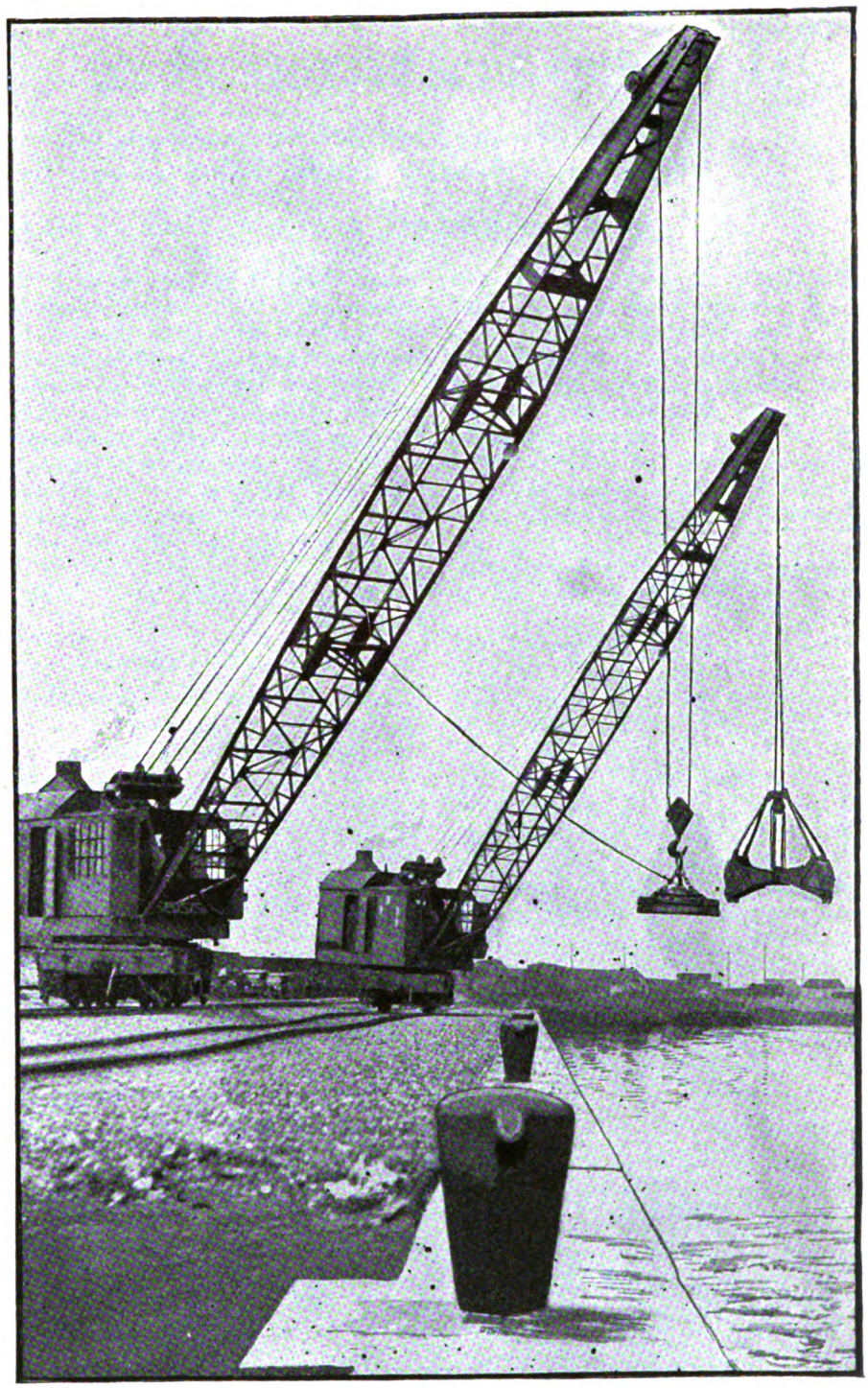
The new Pennsylvania railroad dock is a strip of concrete 500 feet long, on a slip on Whisky island, near the mouth of the river, and near the Pennsylvania ore docks.

The dock is served by two 35-40-ton locomotive cranes with 70-foot booms, equipped for lifting magnets, fall blocks and clam shell buckets. Each crane is equipped with a 10 kilowatt generator having sufficient power to energize a 55-inch lifting magnet. For handling loose materials excavator type buckets of two cubic yard capacity are employed. The cranes and buckets were built by the McMyler-Interstate Co., Bedford, O., and the lifting magnet by Ohio Electric & Controller Co., Cleveland.

The cranes have a line speed of 225 feet per minute, a travel speed of 300 to 450 feet per minute and a drawbar pull of 13,000 pounds. They are equipped with jack-arm outriggers. The air for the brakes, which operate on all eight wheels is generated by 8 x 8 x 10-inch compressors manufactured by the Westinghouse Electric & Mfg. Co. The cranes are of the same model as those operated by several other terminal companies, including the Cleveland Stevedore Co., and the Detroit Railway & Harbor Terminals Co.

The dock was built by the Cleveland Engineering Co. It can handle any freight not requiring coverage, and has storage space for approximately 100,000 tons for concerns which cannot unload full cargoes at their plants. A steel transfer warehouse will be built later.

The dock is leased and operated by the Cleveland Lake Terminal & Dock Co. Its manager is Charles E. Cole formerly superintendent of the Pennsylvania ore dock, and a member of the rivers and harbor committee of the Cleveland chamber of commerce. Other stockholders are A. E. R. Schneider, manager of the vessel department, Cleveland, Cliffs Iron Co.; F. W. Steinen, of the General Transit Co.; C. F. Taylor, Superior Fuel Co.; E. B. Thomas, chairman of the rivers and harbor committee of the chamber of commerce, and two or three others.



FREIGHT FROM THE IRON AND STEEL DISTRICTS OF OHIO, WEST VIRGINIA AND WESTERN PENNSYLVANIA IS TO BE HANDLED OVER THIS NEW DOCK AT CLEVELAND

Begin Big Harbor Work at Buffalo

Celebrated by appropriate ceremonies the great harbor work which the city of Buffalo has had under consideration for some time, was started officially on August 17. A great gathering of people among who were a number of leading lake shipping men witnessed the official commencement of the work by Commissioner John J. Love.

The new harbor project at the foot of Michigan avenue contemplates two dock piers, inside of which, ten boats can be accommodated. This part of the work will be completed at the end of the season of 1927. Seven additional piers are to be constructed, which will when completed give dockage space in all to about 85 vessels.

The Lake Carriers' association was well represented, some in attendance being, President John S. Ashley, George A. Marr, secretary-treasurer, Newton D. Baker, general counsel, John T. Kelly of the Columbia S.S. Co.

Oil Separators Are Economical

Practical Devices Perfected for Separating Oil from Bilge and Ballast Water—Oil Content Can Be Removed with Saving to Shipowner

BY H. S. HELE-SHAW, L. L. D., D. Sc., F. R. S. and ALBERT BEALE, Wh. Sch.

OIL ON troubled waters has a beneficent action which has long been proverbial. That a relatively small amount of oil can calm a large area of sea is due to its great capacity for spreading, for a film of oil will extend unbroken to a remarkable degree of tenuity. This property has also in recent years been beneficially employed in reducing the scourge of malaria by sealing the breeding places, in pools and swamps, of the mosquitoes which carry the infection.

The same property, however, has still more recently forced itself upon the attention of mankind, in an aspect the reverse of beneficial. Pollution of the seas by oil has become one of the most distressing features of our civilization, and it is to the elimination of this that we desire to direct attention.

Oil pollution is due mainly to the discharge of oily ballast water by some four thousand oil-burning vessels, and to a less extent to the discharge of oily bilge water from ships of all types. The evil has become so great as to necessitate the earnest attention not merely of local authorities but of the governments of maritime nations.

During the Great War oil-burning tonnage increased enormously, while at the same time attention to the preservation of amenities was relaxed, with the result that wholesale pollution of the seas passed almost unregarded until the postwar period gave opportunity for the consideration of this matter along with other legacies of the war.

Features of Oil Pollution

It may be urged in extenuation of the shipowners, who in seven years of peace have still failed to eliminate oil pollution, that in the course of normal development, unprejudiced by war, the evil would probably never have arisen, as the prevention of the loss of valuable oil would have been provided for in the natural course of sound design.

Now that the trouble exists, it is unfortunate that shipowners are severely handicapped by trade depression, so that no addition to the equipment of a ship, however great the economy shown thereby, is undertaken very readily.

The sea receives and cleanses so much that is unclean that it is at first unthinkable that relatively small quantities of oil can be seriously harmful. There are three reasons however, why oil is exceptional: first, it floats; second, it spreads; and third, it persists.

By its remarkable capacity for spreading (one pint of oil will form an iridescent film over an acre in extent) a relatively small quantity of oil forms an extensive film on the surface, making it unsafe for sea birds, whose wings it clogs, and preventing that aeration of the water which is essential to life below the surface.

Humanitarian considerations alone provide sufficient reason why the millions of gulls and other birds around our shores should be saved from a painful and lingering death, but, in addition, the fact that gulls perform a most useful service in indicating to fishermen the presence of shoals of fish provides a further and conclusive argument for their protection.

A paper read at the summer meetings of the sixty-seventh session of the Institution of Naval Architects, held in Belgium, June 25, 1926.

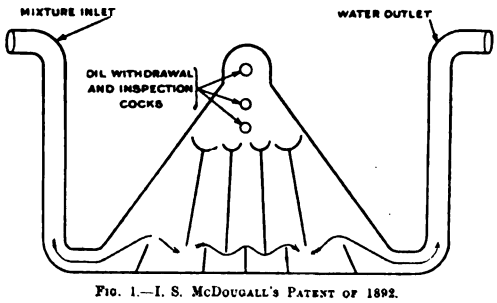


FIG. 1.—I. S. MCDOUGALL'S PATENT OF 1892.

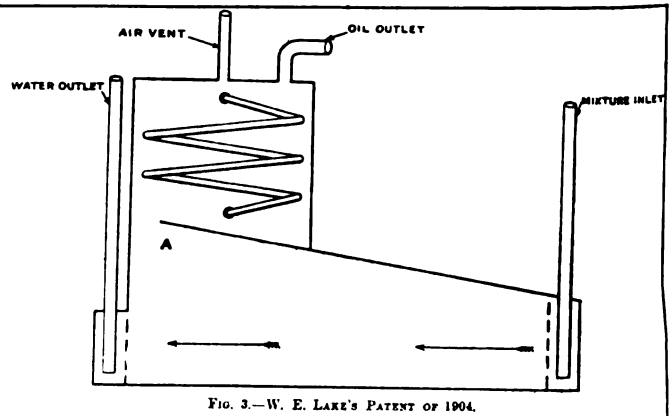


FIG. 3.—W. E. LAKE'S PATENT OF 1904.

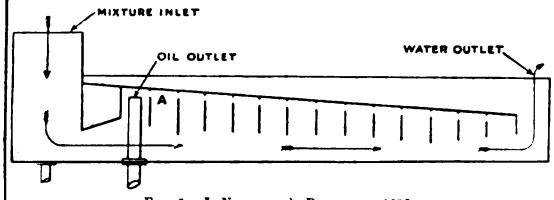


FIG. 2.—J. NICLAUSSE'S PATENT OF 1903.

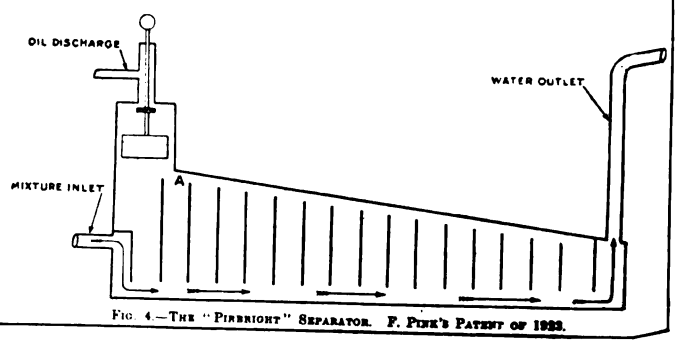


FIG. 4.—THE "PIBBRIGHT" SEPARATOR. F. PIBB'S PATENT OF 1923.

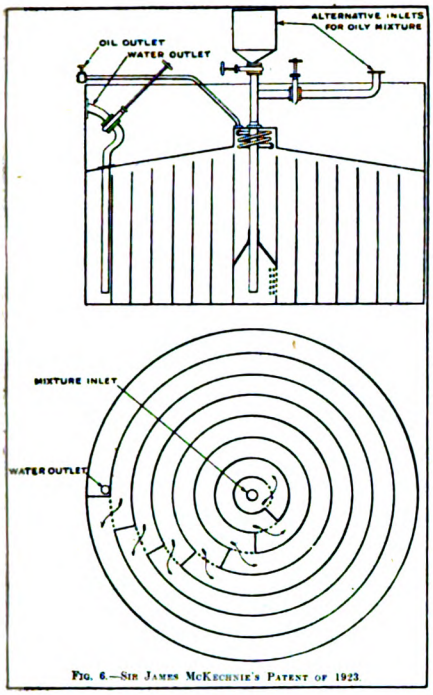


FIG. 6.—SIR JAMES MCKECHNIE'S PATENT OF 1923.

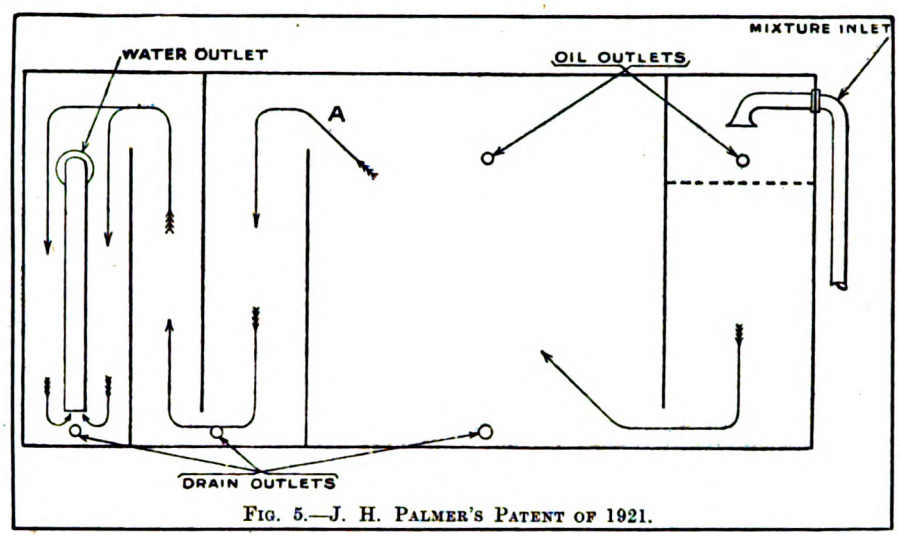


FIG. 5.—J. H. PALMER'S PATENT OF 1921.

The persistence of the oil film due to the fact that there is nothing in sea water to dissolve or disintegrate it causes it to accumulate continually, and, although this may be a less evil, that which washes up on the beaches forms with the sand an objectionable mixture which constitutes all the more a nuisance because it is often not apparent until revealed by the clothes and limbs of holidaymakers.

More serious aspects are the trouble caused to authorities responsible for the upkeep of quays, docks, piers and promenades, and the dangerous fires which may be caused on enclosed waters. All these troubles arise from the loss and waste of what in its right place is a valuable substance, the exhaustion of which is a grave danger to the world.

Dealing With Oil Pollution

Measures taken to restrict oil pollution date from the "oil in navigable waters act" of 1922, by which the discharge of oil in British territorial waters was prohibited under penalty of heavy fines. The United States government made a similar enactment in 1924.

Reports from local authorities around the British coast published in a white paper of May 1925, indicate that while the enforcement of the act appears to have reduced pollution in a few localities, conditions, on the whole, remain unsatisfactory. A great deal of oily ballast water is now pumped out just beyond the three-mile limit, and still reaches the coasts, while oil discharged even farther away remains a floating menace to bird and fish life until the action of wind and tide brings it to some unlucky shore.

The prevention of the pumping of oil into territorial waters (or even wider limits) appears, therefore, to afford very little restriction of pollution; and the obvious conclusion is that pollution will only cease when the discharge of oil is absolutely prevented. An International conference on oil

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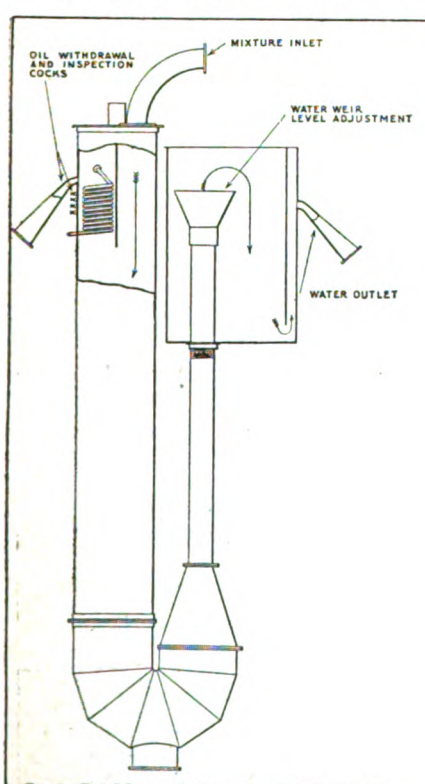


FIG. 7.—THE "CONDUIT" SEPARATOR. R. C. KNIGHT AND H. D. SMITH'S PATENT OF 1923.

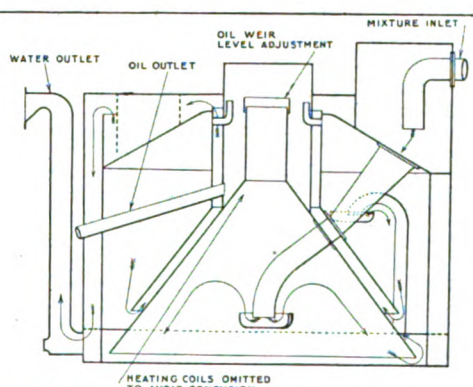


FIG. 8.—THE "ROCKET" SEPARATOR. H. M. ALEXANDER'S PATENT OF 1923.

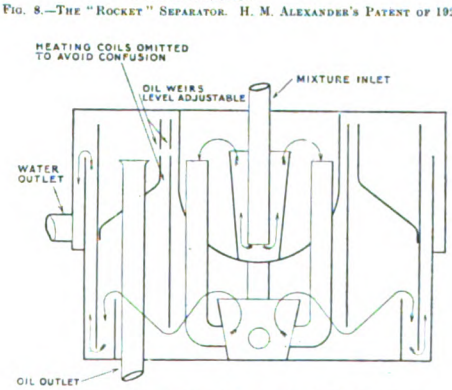


FIG. 9.—THE "WHITE-COMYN" SEPARATOR. B. D. COMYN AND W. A. WHITE'S PATENT OF 1923.

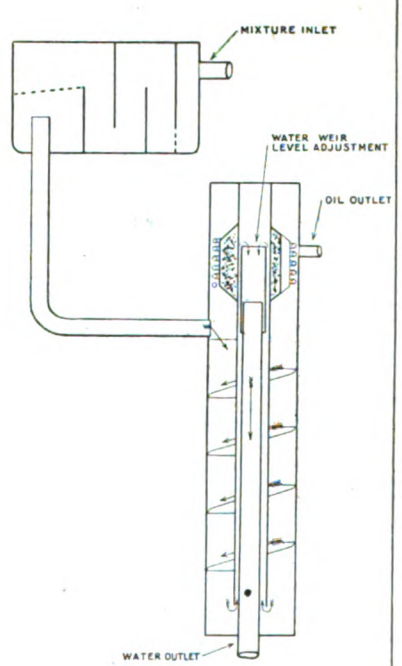


FIG. 10.—THE "FISHER" SEPARATOR.

Newell Made Manager at Camden Yard

The American Brown Boveri Electric Corp. has announced the following changes in its shipyard personnel effective July 29:

Harry A. Magoun, senior vice president, at his own request, has been relieved from active duty and is now acting as consultant in the shipbuilding division. Mr. Magoun has been an outstanding figure in American shipbuilding for many years. He joined the staff of the New york Shipbuilding Corp. (now American Brown Boveri Electric Corp.) as assistant to the president, Aug. 1, 1907; was made vice president Oct. 8 of the same year; and senior vice president Sept. 9 1918.

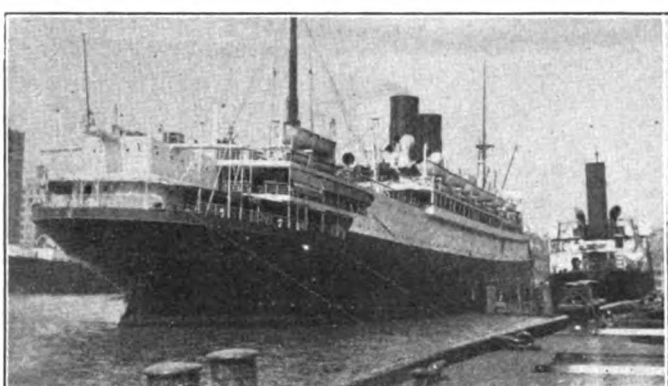
William E. Groesbeck, vice president since Sept. 9, 1918, has also been relieved, at his request, from administration duties and responsibilities. He will however continue as vice president, acting in an advisory capacity in all matters relating to procurement of shipbuilding contracts and he will conduct all correspondence with the United States navy and other divisions of the government. He will be assisted by R. A. Worman.

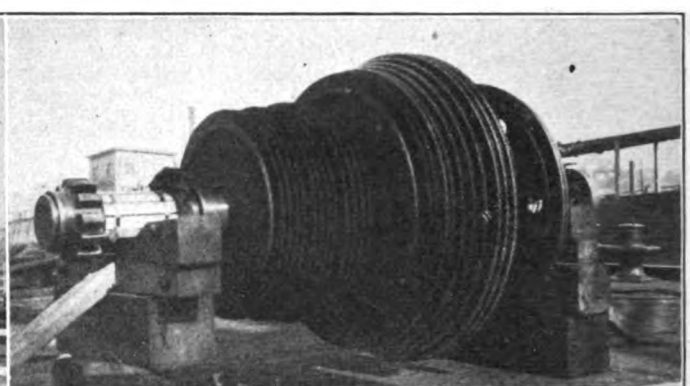
W. S. Newell formerly in charge of shipbuilding at the Bath Iron Works has been appointed general manager of the shipbuilding division. He will have administrative control of all forces and the execution of all shipbuilding or other activities of this division.

Colonel Pomeroy 1845-1926

Col. Albert A. Pomeroy, the man who founded the *Marine Record*, a weekly publication devoted to shipping on the Great Lakes, in Cleveland 1878, died July 25, at St. Paul, Minn., while visiting his daughter, Mrs. C.

Reblade Turbines on Liner DeGrasse





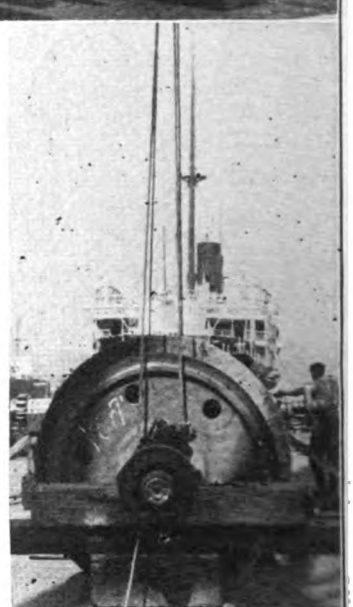
PERHAPS in no other port in the world can difficult ship repair jobs be handled so quickly and efficiently as in New York. The accompanying photographs show the French liner DE GRASSE *and the rotors of her turbines. Recently on arrival in New York it was found that several rows of blading in both low pressure turbines, of which she has two sets of Parsons cross compound type, had been damaged.*

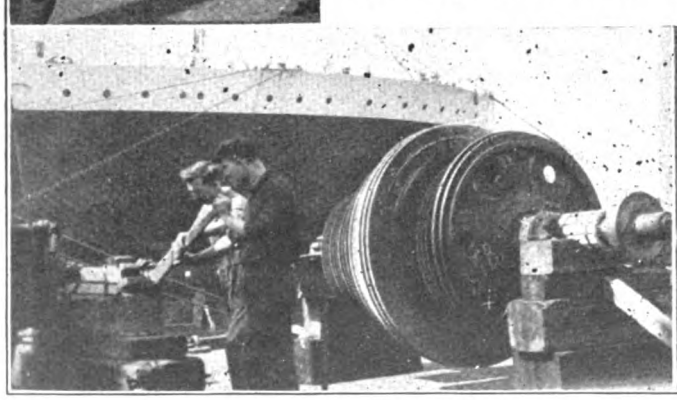
The contract for repairing and renewing these units was carried out by the Todd Shipyards Corp. at the Tietjen and Lang plant, Hoboken, N. J. The rotors were removed from the vessel and the work in reblading testing and balancing was done in the shop.

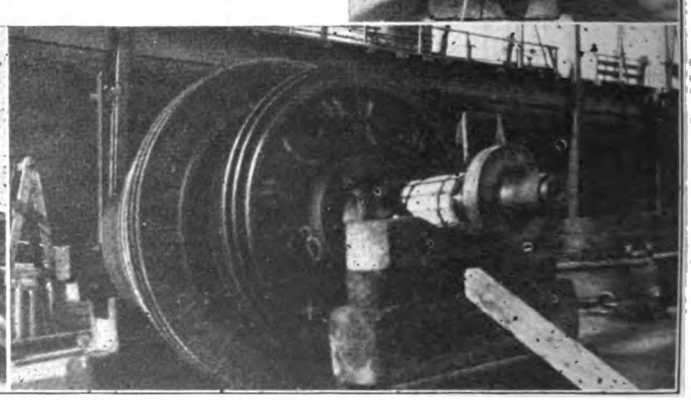
Due to the ship's great depth it required the largest derrick of the Merritt, Chapman and Scott Wrecking Co. to remove and replace the rotors.

The DE GRASSE, *a supurb transatlantic liner owned and operated by Cie-Generale Transatlantique, was built by Cammell, Laird & Co., in* 1924. *She is* 552 *feet long, and* 71.2 *feet in beam, and is* 17,707 *gross tons. She is propelled by twin screws.*

A job of this nature must be both quickly and well done. It was completed on time. The turbines were given a good test and the vessel sailed promptly.







B. Hall. He was 81 years of age and had retained to the end a vigorous mind and body. In later years he was very much interested in searching for information which would be useful as a historical record of the early days of shipping on the Great Lakes. He had a scholarly appearance and a pleasant likable personality.

Colonel Pomeroy published, owned and edited the *Marine Record*, a weekly publication, later the MARINE REVIEW, for 18 years. The MARINE REVIEW, now, nearly 50 years after its foundation, continues to be published at Cleveland as a monthly publication, devoted to the interests of all shipping.

Shipbuilder Drowns

Unselfishly sacrificing himself in order to save others, W. H. Smith, assistant superintendent of the Collingwood Shipbuilding Co. Kingston, Ont. lost his life by drowning, on July 25. The accident took place about a half mile out from the shipbuilding company's drydock. Mr. Smith accompanied by his wife, had gone out to give aid to a boat stranded in mid stream. In bringing this boat to shore he fell into the water while giving out more line.

His home was in Owen sound. He came to Collingwood two years ago succeeding J. C. Beaudin. He was a nephew of H. B. Smith, president of the Collingwood Shipbuilding Co., and had served over seas.

Order Steering Gears

Twelve electric and 12 hand steering gears have been ordered from the American Engineering Co., Philadelphia, for installation on six diesel-electric automobile ferries now being built for Hudson river service by the American Brown-Boveri Electric Corp., Camden, N. J.

The American Engineering Co. also has received an order from the Newport News Shipbuilding & Drydock Co., Newport News, Va., for an electric windlass and an electro-hydraulic steerer for the coastguard cutter BEAR.

Propellers Prove Durable in Service

THE Argentine battleships, RIVADAVIA and MORENO were originally built in the United States. The RIVADAVIA at the Fore River plant, Quincy, Mass. and the MORENO at the New York Shipbuilding Corp., Camden, N. J. These vessels were completed in 1914. In the summer of 1924 the Bethlehem Shipbuilding Corp., Ltd., received the contract for the reconditioning of the two battleships. A very elaborate rebuilding program was carried out, in which was included the building and installation of the latest type of turbines and reduction gears and the conversion from coal to oil burning.

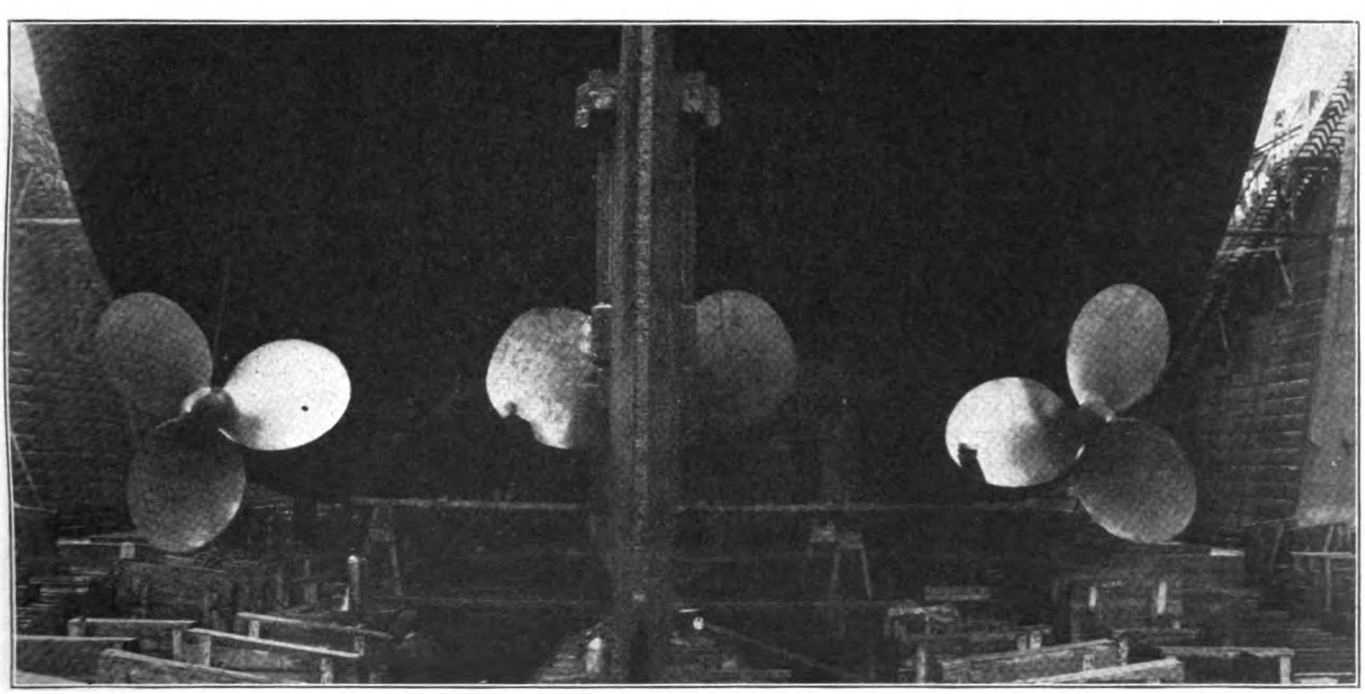
The RIVADAVIA was completed during January, 1926. In the March number of MARINE REVIEW, on page 15 will be found an account of the successful trials of this vessel off Rockland, Me., Jan. 21, 1926.

Through the courtesy of Capt. Felipe Fliess of the Argentine navy, commander of the RIVADAVIA, photographs of the battleship in the Commonwealth dry dock, Boston, on Jan. 19, were furnished to The International Nickel Co. This company was particularly interested to find that the three monel metal propellers which were cast by the company's foundry in Bayonne, N. J., in 1912 were in perfect condition.

After 14 years' service these propellers as can be seen from the accompanying photographs show no signs of corrosion or erosion. Each of the three propellers weighs 16,000 pounds and is made of solid cast monel metal. The RIVADAVIA and her sister ship, the MORENO have been constantly in salt water with the exception of several short periods in dry dock for overhauling and about six months spent in the fresh water of the River Plate in Argentina above the tidal influence. She has steamed over 50,000 miles including trips to the

(*Continued on Page* 54)

The photographs and the facts from which this story was prepared were furnished at the editor's request by the International Nickel Co., 67 Wall street, New York City.



STERN VIEW OF THE ARGENTINE BATTLESHIP RIVADAVIA IN THE COMMONWEALTH DRY DOCK, BOSTON, JAN. 19, 1926—SOLID CAST MONEL METAL PROPELLERS FITTED IN 1914 WERE FOUND TO BE IN PERFECT CONDITION

From the Old Log Book

Stray Items About the Great Lakes, Atlantic, Pacific and Gulf Coasts and Inland Rivers from MARINE REVIEW Files of 10, 20, 30 and 42 Years Ago

SEPTEMBER 1884

FORTY-TWO years ago the *Marine Record*, then the name of MARINE REVIEW and a weekly noted in its Sept. 4, 1884 number that the new iron steamer, WILLIAM CHISHOLM, took on 2331 tons of coal at Axworthy's dock, Cleveland and cleared for Chicago drawing 14½ feet of water. The vessel arrived at Chicago on Tuesday, the account went on, after a run of 3½ days, in time to meet the rise in grain freights.

* * *

THE little iron steamer drawing 14½ feet loaded marked the beginning of the era that was to bring about the building of ever larger and larger iron and steel ships.

* * *

ON JULY 30, 1926, the Bradley Transportation Co., Rogers City, Mich. ordered from the American Shipbuilding Co. a self-unloading steamer for the stone trade, to be 637 feet in length overall, 615 feet length of keel, 65 feet in beam and 33 feet in depth. She will be the longest vessel ever constructed on the Great Lakes and the motive power will be of the most modern type. A steam turbine generator, delivering electric power to a single large motor attached to the propeller will furnish motive power. This vessel will have a carrying capacity of 13,000 tons on a draft of 20 feet.

* * *

IN 1884 the schooner Homer, Captain Barnes, took coal from Cleveland to Chicago at 65 cents; the schooner W. L. Peck, coal, Cleveland to Houghton at 70 cents; the schooner M. S. Bacon, ore, Escanaba to Cleveland at 75 cents. In those days schooners were still the chief reliance of the ore and coal carrying trade.

SEPTEMBER 1896

A CURIOUS dry dock accident is recounted in the Sept. 3, 1896 number of MARINE REVIEW, then a weekly. The dry dock was referred to as the Simpson dock at the New York navy yard, evidently built under the Simpson patent of the old Boston dry dock firm. The dock in which the accident occurred was of wood 500 feet long with a top width of 130 feet 4 inches. After the dock had been pumped out the caisson which closes its mouth was lifted from its seat in some unknown manner, admitting water.

* * *

THE more water admitted the further the caisson was lifted from its seat until finally the water rushed madly into the dock carrying with it the caisson which capsized and sank. The torpedo boat Ericsson was also carried along with the rush of water and had her bows stove in. The commandant's launch was wrecked and several other vessels were torn from their moorings. The accident was a most unusual one and was attributed to the lightness of the caisson.

* * *

THE erroneous use of the word "knots" is pointed out in Marine Review thirty years ago. It was very common at that time, the article stated, to use the expression "knots an hour" for speed and "knots" for distance in miles, in spite of the fact, that these expressions were nautical barbarisms. It quoted the writer on nautical subjects in an English magazine to this effect: "The knot is the cosmopolitan unit of speed employed at sea by sailors of civilized nations. One knot is a speed of one nautical mile an hour. . ."

SEPTEMBER 1906

IN SEPTEMBER 1906 L. C. Sabin was appointed superintendent of Saint Mary's Falls canals in place of Joseph Ripley who had been appointed by President Roosevelt to supervise the construction of the locks of the Panama canal. Nearly twenty years after this appointment Mr. Sabin was appointed vice president of the Lake Carriers association.

* * *

WITH reference to the growth in length of vessels on the Great Lakes, it is interesting to note that Henry Penton, while chief engineer of the Great Lakes Engineering Works, had predicted when criticisms were heaped upon the builder of the first 400-footer, that he looked to see the 600 footer before long. In a list of vessels published in Marine Review, in its issue of Aug. 30, 1906, there were 13 of 600 feet in length or upward and, the account went on to say, that James C. Wallace, then president of the American Shipbuilding Co. had been quoted as saying that his company had plans under way for a ship 645 feet long. Now that a vessel of 637 feet in length is to be built by the same company, Mr. Wallace's predictions may yet come true.

SEPTEMBER 1916

RALPH D. WILLIAMS for 15 years editor of MARINE REVIEW died ten years ago on August 14. He became the editor of MARINE REVIEW in 1900 and continued in this position until June 1, 1915 when he retired on account of ill health. He was the author of the Honorable Peter White, a biographical sketch of the Lake Superior iron country, published in 1907.

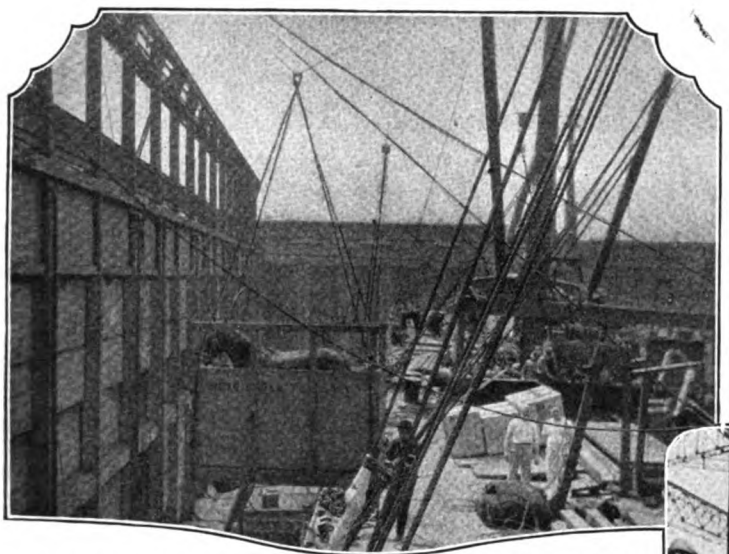
* * *

THE effect of the war on shipbuilding is very clearly brought out in a table published in the September 1916 number of Marine Review. American yards as of July 1, 1916, compared with German yards as of December 31, 1913, had under construction 195 vessels of 1,037,103 gross tons whereas the German yards had under construction 104 vessels of 810,520 tons. There is in this same article a number of other interesting comparative tables having to do with world and American shipbuilding and commerce and trade.

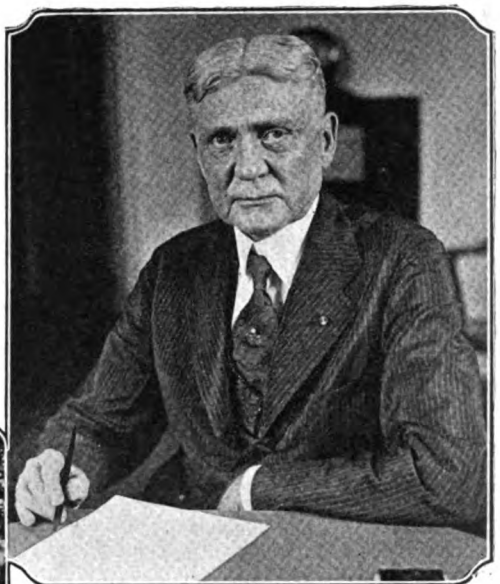
* * *

A LITTLE over ten years ago the steamships KOREA and SIBERIA were sold by the Pacific Mail Co. for slightly over $5,000,000 for the two. These vessels were sold to the Atlantic Transport Co. for service between Great Britain and New York. Hardly a year later they were sold by the new purchasers for, it was reported, $2,000,000 each to the Toyen Kisen Kaisha Co.

Latest Marine News in Pictures



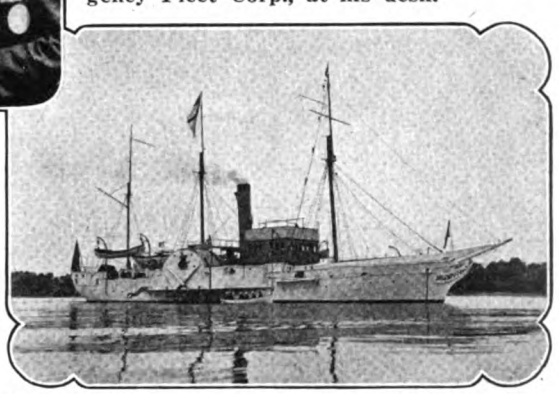
A friendly greeting at Newport News Shipbuilding and Drydock Company.



Gen. A. C. Dalton, who succeeded Elmer E. Crowley as head of the Emergency Fleet Corp., at his desk.

The President Roosevelt of the United States Lines, brought over 14 yearlings from the Harzburg stud. A safe and efficient method of discharging these valuable horses is shown.

Boy Scout, Ralph S. Mahan Jr. bringing a message to Commander R. E. Bird on board the S. S. Chantier.



U. S. training ship Wolverine, oldest iron ship on the Great Lakes, goes out of commission. Though a side wheeler, this vessel has something of the beauty of lines of the old sailers.

Billie Linn, popular chief steward, of the Leviathan of the United States Lines, the finest American merchant vessel. He handles his job efficiently.

Fort Gratiot Light at entrance to Lake Huron. Steamers bucking the ice, April 16.

John Paul Jones, one of the founders and brilliant early leader of the United States navy. On July 6, Admiral E. W. Eberle, chief of operations of the navy in the presence of a distinguished gathering laid a wreath on the monument to this great American sailor.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

A SEAMAN and experienced water tender must be presumed to have been acquainted with his duties, and being in charge of work of removing a boiler cover, by the fall of which he was injured, it was his duty, according to the decision in the case of WACO, 3 F. (2d) 476, to avail himself of tackle provided for the work, and where rope was unsafe he should have procured other rope or reported the condition to his superior officer; placing of staging or a platform in such position that the seaman could not escape injury if the cover should fall, is negligence of the shipowners, under the rule that a vessel must be in all respects seaworthy, which is the equivalent of the common-law duty of providing safe place to work.

* * *

STEVEDORING is a maritime service," said the court in the case of In Re Atlantic, Gulf & Pacific Steamship Co., 3 F. (2d) 309, "and when rendered to a ship not in her home port gives rise to a maritime lien." This is true, the court said, whether the libelant physically works or is a contractor employing others. It was said in the same case that an assignment or pledge of sums due for freight in consideration of advancements furnished, without restriction as to purpose, does not create a maritime lien and is subordinate and inferior to a stevedore's lien; further, that a stevedore need not inquire as to an existing mortgage or other nonmaritime hypothecation as to which his rights are superior, and neither the shipowner nor the assignee of freights may complain that such inquiry was not made. In a companion case, reported in 3 F. (2d) 311, it was held that the assignee of maritime freights, under assignment for advancements made without specifying maritime use, has no maritime lien, and his claim is inferior and subordinate to that of one who furnished fuel oil to the ship for the voyage upon which the several months of preparation, the assignee's claim is based.

* * *

IN ADMIRALTY, a seaman is not precluded from recovery for personal injuries by his contributory negligence; but, where the accident is caused partly by the shipowner's negligence, the damages caused by the injury may be divided.—WACO, 3 F. (2d) 476.

* * *

IT WAS decided in the case of Methodist Episcopal hospital v. Pacific Transport Co., 3 F. (2d) 508, that a hospital can recover from a shipowner reasonable value of treatment furnished a seaman, injured while in the shipowner's service, at the seaman's request, on the shipowner's failure to furnish treatment.

* * *

A TUG, which towed a barge containing intoxicating liquor, unladen, without the permit of a customs collector or of a naval officer, in violation of law, was not subject to seizure or forfeiture, either on the theory that the barge and tug constituted one vessel, or that the tug was part of the "tackle, apparel, and furniture" of the barge.—DOLPHIN, 3 F. (2d) 1.

* * *

A MARITIME lien under the merchant marine act of 1920 for a marine engine, if a lien existed, was, according to the decision in the case of DEFIANCE, 3 F. (2d) 48, defeated by the unconditional delivery of the engine to the owner at a point distant from the vessel, instead of to the vessel's side. It was further held that where no maritime lien existed in favor of the seller of a marine engine, the transferee of the purchase-money note acquired no lien; also, that one who, on the master's credit, advanced money with which the master of the vessel purchased the marine engine, acquired no maritime lien.

* * *

WHERE a minor was assaulted while a passenger on a ship, and on arrival in port was taken to the offices of the ship owner, where she was fully interrogated, an action for the assault was not barred by failure to give formal notice of the claim within ten days, as required by a limitation printed in small type on the back of her ticket, which was not called to her attention.—Sutton v. Pacific Steamship Co., 3 F. (2d) 72.

* * *

A LOG raft is a "vessel," it was held in the case of LIBBY MAINE, 3 F. (2d) 79, and is subject to inland rules as to fog signals; the mere fact of anchorage of a log raft in a harbor without a written permit was not a bar to the recovery of damages for a collision, which was the result of the negligence of another.

* * *

A "LAID-UP fleet" of government ships not fit for service without several months of preparation the facts and reasonable inferences therefrom showing withdrawal from navigation, was not a "vessel," within section 4612 of the United States revised statutes, defining a "seaman" as one working on a vessel, and a "vessel" as "every description of vessel navigating on any sea, or channel, lake or river"; and those employed thereon, it was said in the case of Gonzales v. Unitel States shipping board, Emergency Fleet Corp, 3 F. (2d) 168, were not seamen but workmen, not entitled to maintain an action at law for injuries received in working in the dead ships as seamen.

* * *

ONE hiring a derrick boat for a certain number of days, during which, if needed, it might be worked eight hours, and who was liable for extra work if worked more than eight hours on any single day, was not entitled, according to Sherwood v. American Sugar Refining Co., 3 F. (2d) 332, to set off night shifts, when the boat was worked, against days when it did not work at all.

* * *

A LIMITATION in bills of lading of an American steamship company of three months for bringing suit for damage to a cargo was held in the case of Green Star Steamship Co. v. Nanyang Bros. Tobacco Co., 3 F. (2d) 369, unreasonable and invalid as applied to shipments from the United States to China.

* * *

AN AWARD, which included payment for the time of a vessel and crew from the time of leaving to their return to port, and a bonus of $40.00 was fair and reasonable, it was decided in the case of NAIWA, 3 F. (2d) 381, where it appeared that libelant, with a wrecking steamer and large crew, successfully salvaged a steamship which had been stranded in the Bahamas for 20 days and a part of her cargo jettisoned, the steamship being worth before stranding, with cargo, $2,075,000, and that there was a loss on vessel and cargo, because of stranding of $870,000, the work being efficiently done, but involving no special element of danger.

* * *

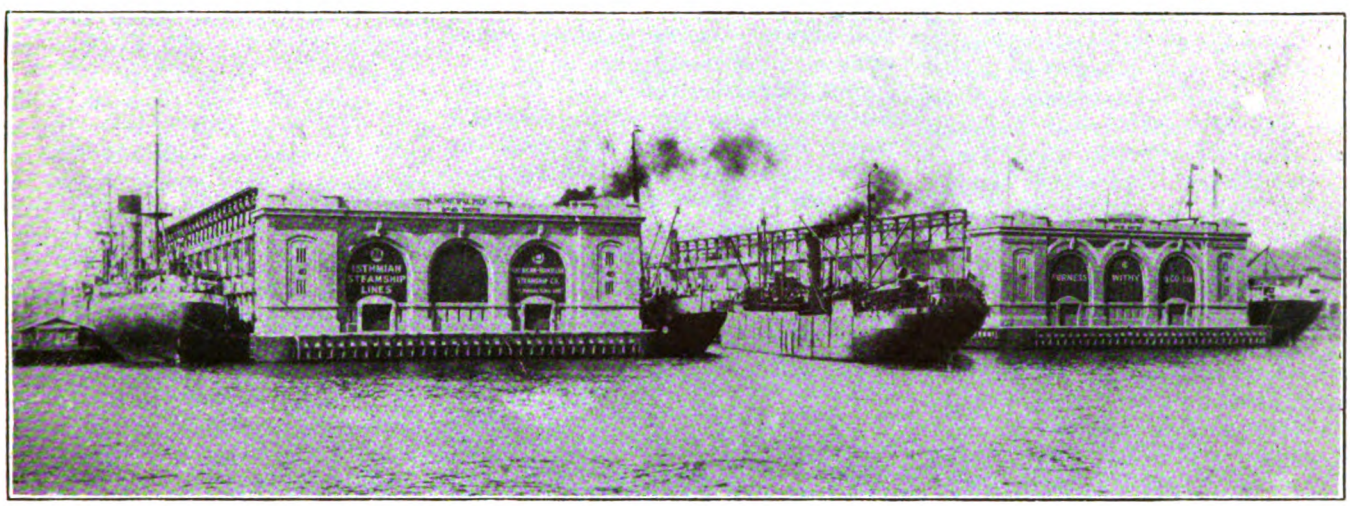
THE Jones act of March 4, 1915, prescribing rights of seamen, enforceable in the district in which the defendant employer resides or in which his principal office is located, authorizes actions against corporations organized outside the United States; the "principal office" of such foreign steamship company being the principal place where it does business in the United States.—Stewart v. Pacific Steam Navigation Co., 3 F. (2d) 329.

* * *

THE making of repairs furnishes no inferences that a vessel was unseaworthy or not cargoworthy before receiving such repairs.—GOYAZ, 3 F. (2d) 553.

Dock Management Progress Section

How Successful Dock Operators Have Met Problems of Giving Best Service to Ships



Municipal Piers No. 38 and No. 40 South, Department of Wharves, Docks and Ferries, City of Philadelphia

Cargo Handled Economically at Philadelphia Piers

BY ELMER SCHLICHTER

THE progress of the city in a business sense is reflected strongly in the trade of the port of Philadelphia which is continually increasing in value. That the legislative and administrative officials of the city are keen to do their part in keeping step with this quickened industrial enterprise was shown within the past month when, in furtherance of the plan to extend the shipping facilities of the port a contract was awarded for the construction of a pier at the foot of Jackson street, on the Delaware river. This action is in line with the general policy of upbuilding and developing the water front of the city. In the past twenty years approximately $30,000,000 have been spent by the municipality alone in extending the pier system, acknowledged to be the best maintained at any port in the United States. This, too, aside from huge amounts spent by the government in pier construction and in channel deepening; by the city and state of Pennsylvania, jointly, in a $28,000,000 bridge project and by corporate and private enterprise in improvements designed to increase the industrial importance of the port of Philadelphia.

In 1925 Philadelphia continued its reputation as the world's workshop through the expansion of the output of the large variety of manufacturing plants within the metropolitan district of the city, a territory which embraces eastern Pennsylvania, southern New Jersey and Delaware. Estimates place the number of wage earners in this district at more than 926,000, with a yearly payroll in excess of $1,057,000,000, paid out by more than 24,000 manufacturing plants. These industries purchase materials to the extent of $3,021,000,000 each year and the annual value of their products totals $5,375,000,000, representing nine per cent of the total output of all manufacturing plants in the United States.

In the heart of this vast industrial wokshop lies the port of Philadelphia in and out of which there is annually shipped to and from foreign and domestic ports cargoes valued at hundreds of millions of dollars. In the foreign trade alone the value of the cargoes totaled $333,950,146. These figures actually indicate that the importance of Philadelphia in the merchant marine field is steadily increas-

Trade Increases With Port Development

Anyone familiar with the port of Philadelphia knows that the city is pursuing an active policy of terminal development. The wisdom of such a course is demonstrated in the growing value of both domestic and foreign trade. As the seaboard terminus of one of the richest industrial sections in the country its growth and prosperity can only be checked through inadequate outlet by water to markets at home and abroad. With the existing great modern piers and additional projects underway Philadelphia's natural expansion as a seaport is assured.

The author is statistician of the Department of Wharves, Docks and Ferries, Philadelphia.

ing and that a large fleet of vessels availed itself of the admirable docking and shipping facilities at this port last year.

One of the logical sequences of the development of the port of Philadelphia has been an increase in the demand for passenger service, not only to domestic ports but between Philadelphia and European cities. While the great modern piers built by the city are constructed for handling cargo ships it has been shown that passenger vessels can be accommodated and with this in mind several steamship companies have made plans for a greater number of passenger sailings. Among these is included the North German-Lloyd line which resumed its scheduled service between Philadelphia and German cities. Recently the Munson Steamship line brought the palatial liner AMERICAN LEGION to the port and berthed her at municipal pier, No. 19, North wharves. She carried three hundred and fifty passengers and remained here during the period of the Shriners' convention in which the passengers participated.

The city of Philadelphia has expended up to the present time approximately $30,000,000 and has been enabled, through this expenditure to equip the port with water terminals unmatched by any other port in the United States or in Europe.

Federal Government Also Co-operates

This was in addition to large sums spent by the United States government, not only in digging and maintaining a channel which required continually increased depth, but in the construction of one of the largest shipping terminals in the world.

It has not been so many years ago when ships drawing more than 22½ feet found it impossible to navigate the Delaware river without great delay. Craft of even this minimum draft were required to anchor and await the rising tide in order to pass over several of the shoal areas, namely Fort Mifflin bar and Cherry Island flats.

Huge Trade Through Port

The activity of the friends of the port always centered upon the deepening of the channel as one of the important improvements. A 26-foot channel project was first adopted; then a 30-foot channel, and about 15 years ago a 35-foot project. At this time this project is 72 per cent completed, as based upon the cost and not upon the yardage. During the life of this project a total of 50,800,000 cubic yards of material have been removed, and it is estimated that appoximately 3,325,000 cubic yards of dredged material and 90,000 cubic yards of ledge rock must be removed to complete the channel to the project dimensions. This will probably take six years, but this fact has not prevented friends of the port to urge the beginning of work upon a 40-foot channel project. To this end a bill has been introduced in congress.

The growth of the port requires such a channel. The foreign and coastwise trade in 1925 was valued at over one billion dollars. The foreign trade included imports valued at $215,313,394, and the exports at $118,636,752, a total of $333,950,146. The customs receipts were $50,726,990. Millions of dollars were expended by the huge fleet of vessels which arrived and departed at the port of Philadelphia during the calendar year. The total number of ships was 11,271, of a gross tonnage of 36,960,632, an increase of 375 vessels over the number of the previous year, and an increase in tonnage of approximately two million tons.

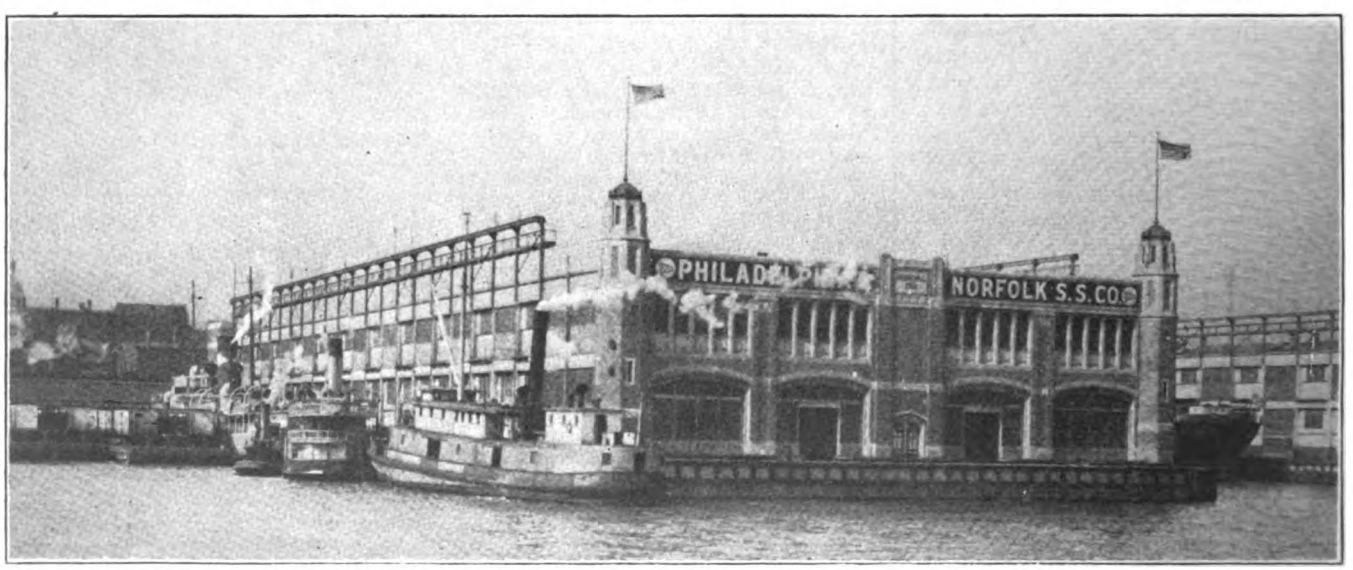
The increasing facilities have served to bring to the port a larger number of carrying lines with attending advantages in service. This has been manifest particularly in the intercoastal traffic. The port has earned a reputation for expenditious and economical handling of ships of heavy tonnage, and this effort has not been confined to cargoes of a certain kind, but to a wide variety of cargo shipments. Within a few days one of the largest American tankers arrived with the record shipment of 5,089,014 gallons of crude oil together with a British steamer which carried 18,976,000 pounds of cane sugar from Palo Alto, a new shipping port in Cuba, and paid approximately $350,000 duty thereon, said to be the largest ever paid on a single consignment by a local refiner. The shipment of completely assembled locomotives from the port of Philadelphia to foreign ports has become routine.

Water Front Values Increase

The development of the port of Philadelphia has meant much to the city. Riparian property as the result of the improvements made by the city has gone up by leaps and bounds. One of the obsolete wharf properties which had lain idle for years, was purchased three or four years ago for an amount near $250,000 and has recently been sold for more than one million dollars.

The activity of the municipality has been followed by private enterprise. Within the past year several large organizations have established plants within the Philadelphia port district. The American Brown-Boveri Electric

(*Continued on Page* 50)



Pier No. 3 North, of the Girard Group of Municipal Piers, Port of Philadelphia

Equipment Used Afloat, Ashore

An Improved System of Automatic Fire Detection for Use on Board Ships—New Design Magnetic Brake—Describing a Diesel Engine

COMBUSTION! What would modern shipping and commerce do without combustion? The combustion of coal or oil furnishes the motive power. Combustion is the efficient and essential servant. All too often this erstwhile servant becomes the master, and then lives and property are lost.

All fires, except those rare aftermaths of explosions, are small in their beginnings. If they can be detected at their inception they can be easily extinguished. The need is for an automatic means of detecting fire. Automatic because much marine property—especially cargo holds, and fuel bunkers of vessels, piers, docks and warehouses—is not under constant human supervision. Then again, humans cannot be depended upon to do the right thing in an emergency.

An alarm must be transmitted in a definite, positive manner to those in authority. Automatic means the elimination of the human element from the equation of detecting and reporting fires. Such a system must be absolutely dependable.

A Fire Alarm System

Marine fire protection engineers are evidencing considerable interest in a new system for marine fire detection developed by the Garrison Fire Detecting System Inc., 79 Madison avenue, New York. The heart of this system is a fire detecting wire which is graphically described in Fig. 1. This continuous thermostat, when connected to the control panels and batteries, carries current on its two conductors.

When heat comes in contact with this wire, the fusible alloy melts, expands and spurts through the lateral slot of the inner conductor and permeates the thread serving and makes a short circuit by coming in contact with the outer conductor, which is a spiral wrapping of brass tape. Thus, the fire itself gives its own alarm.

The fusing and expansion of the alloy are not dependent upon the nerves, instinct or training, but upon a stable basis, an immutable law of chemistry, a law very similar in character to that which governs the expansion of the volume of the water when that water is turned to ice. All of us have had experience with broken bottles, and broken pipes, from freezing water. It is just this kind of a force which causes the fire to tell on itself when the property is protected by means of the fire detecting wire.

Detecting Wire Improved

This fire detecting wire has been on the market for several years. The core and the brass sleeve have not been fundamentally altered, but recently a new improvement has been made of special interest to marine people, namely the original varnished

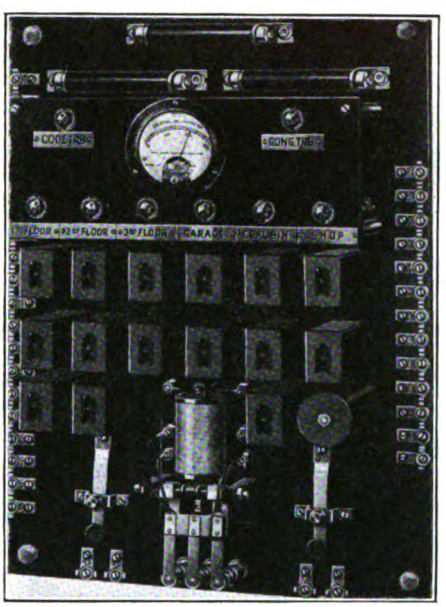


FIG. 2—A TYPICAL SIX CIRCUIT PANEL BOARD FOR THE ALARM WITH THE FIRE DETECTING WIRE SYSTEM

cambric insulation has been abandoned and the outer insulation now is a tube of rubber which is absolutely waterproof. Each coil of wire, after the rubber tube has been applied, and before the outer braid has been affixed, is immersed in water and the rubber tube is subjected to a high voltage break-down test. This waterproof feature is of special value because moisture or water getting between the core and the brass tape sleeve might effect a short circuit and send in a false alarm. A false alarm of this character cannot happen in an installation of this new product.

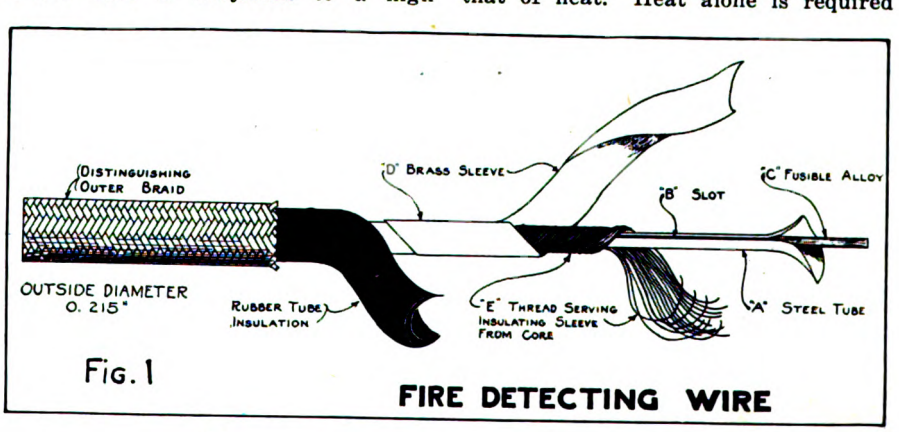
Another new feature that has just made its appearance is a complete system. While the fire detecting wire is the "heart" of any installation, it is of little or no value unless it is connected up to the proper apparatus in order to make use of the short circuit caused by heat.

In Fig. 2 a typical six circuit panel board is shown. The panel board used for this illustration was for a factory, but in place of the "1st floor", "2nd floor", "3rd floor", etc. there can be "hold No. 1", "hold No. 2", "hold No. 3" etc.

This panel board has pilot lamps which light up with the giving of the fire alarm. In addition to these visual signals there are fire gongs. The number and location are determined by the size and arrangement of fire stations on a ship or dock. The visual lamp signals may be duplicated in the engine room, or at any other point that the organization of the ship's crew may require.

Heat Is Determining Factor

It is quite interesting to note that a fire may have any or all of the following three elements: (a) smoke (b) heat (c) flame. All fires do not have smoke in their beginning, and all fires do not have flame. Fires of spontaneous combustion are most deadly and should be detected at their very inception. Thus, it will be seen from analysis that the only element of the three that all fires possess is that of heat. Heat alone is required



to fuse the fire detecting wire. Flame and smoke play no part in the operation. They are merely incidental, and as stated above, are not always present. Cold alone changes water into ice. The other incidentals, such as snow and wind, while they sometimes accompany the coming of the cold, play no part in the freezing of the water.

The time element plays no part in the fusing of this fire detecting wire. There are three kinds of wire available. One fuses nominally at 160 degrees, the second fuses at 212 degrees and the third fuses at 360 degrees. These different degrees of fusing are provided to take care of all conditions on a ship. What is normal temperature for one part of the ship is not normal temperature for another, so with this assortment to choose from the engineer can install in all parts of the ship wire that will detect and report abnormal temperature conditions.

Take the 160 degree wire for example. It does not matter how short a time nor how long a time it takes to reach this degree of heat. Thus, the slowly generating heat of spontaneous combustion origin will turn in an alarm when the temperature of the wire is raised to 160 degrees, just as surely as though the increased temperature were due to a "flash" fire. This wire operates on the fixed temperature principle.

Under Test At All Times

The fire detecting wire is installed upon the closed circuit principle; that is, all of the fire detecting wire and associated connections are under electrical test at all times, so that any breakage of the wire, or disarrangement of the circuit, either accidental or intentional, causes the trouble bell to ring.

The source of power to operate the system is obtained from a standard type of sealed storage batteries. The system is complete in itself. It is not dependent upon an outside source of power which may or may not be ready to operate the lights and the gongs at a crucial time.

The fire detecting wire is quite small in diameter and is readily installed and adapted to the contour of beams and other under-deck structures. For coal bunkers and other places where the liability to mechanical injury is considerable, a steel guard molding is provided. This molding affords ample protection and has slots cut into it which lets the heat get into and operate upon the fire detecting wire.

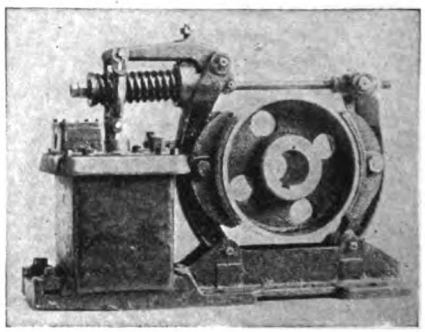
The use of electricity has accelerated and has reduced the cost of operation of our marine work. The electric lamp and the electric motor have increased the efficiency of man in his work upon the water, and now electrical science has placed at his disposal another adaptation of the "magic spark" so that the skipper can now go about his task with absolute confidence that combustion will always remain in its proper sphere, namely as his servant, and any incipient mutiny will be made to tell on itself and thus enjoy but a short life.

New Magnetic Brakes Reduced in Size

The new magnetic brakes, types DI and AI, being manufactured by the Westinghouse Electric & Mfg. Co. for both direct-current and alternating-current service, in addition to being spring set and easily adjustable, have unusually small dimensions, a distinct advantage for industrial and marine applications. The small diameter of the brake wheel requires less power to operate and less time for starting and stopping.

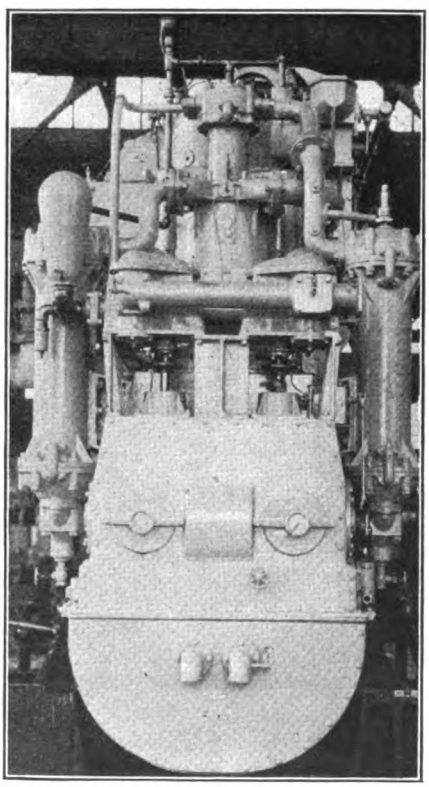
A weather-proof cast steel housing for the magnet, is another feature of these brakes. The magnet and coil unit is protected against damage and the weather. Ample ventilation is provided for by hooded openings in the cover of the housing, and cored holes in the base.

A feature particularly advantageous to machinery manufacturers, is the interchangeability of the magnets of the two types of brakes. The complete magnet can be removed from the brake by simply taking out one pivot pin and loosening two bolts in the tapered blocks, and a new magnet substituted in a very short time. With this design the same equipment may be used for both alternating-current and direct-current work by merely changing the magnet.



A NEW TYPE OF MAGNETIC BRAKE WITH A COMPARATIVELY SMALL DIAMETER BRAKE WHEEL

An 800 H.P. Diesel Engine



FORWARD END VIEW OF THE NEW 800 H.P. WINTON DIESEL ENGINE

THAT there is an increasing demand for the diesel type of marine oil engine in the United States, as well as all over the rest of the civilized world, is becoming more and more evident. The Winton Engine Co., Cleveland, has gained a country-wide reputation for smaller diesel engines. It is therefore not surprising that this company, to meet a definite demand, has now gone into the building of larger engines. The accompanying illustrations show the end and both side views of the new 800-horsepower marine diesel engine now being turned out by this company.

Five of these engines were recently installed; two in each of the yachts ARCADIA and SAVARONA, and one in the dredge VIRGINIA now building for the American Dredging Co. The Winton company, with these engines enters the field of the larger size marine diesels. The impressive service record of their marine diesel engines ranging up to 600-horsepower would seem to be excellent guarantee of the performance of the larger 800-horsepower engine.

The design of the new engine fol-

lows the most advanced engineering lines and a number of important refinements and improvements not customary in engines of this size have been adopted. The company's engineering staff spent over five years in research work preparing for the design of this particular model under instructions from the management, that the engine would not be placed on the market until it was proved beyond a doubt to be under critical test in the very best possible working order. Its lines are especially neat and symmetrical and compactness is combined with strength and rigidity.

A one-piece water box construction is used providing maximum rigidity fore and aft. The two crank cases and the water box are held together by 16 through steel tie bolts from the bottom of the crank case to the top of the water box. These steel tie bolts take the firing stresses of the engine, and consequently no cast iron part is called upon to absorb any of these stresses.

This engine is a four stroke cycle and has six cylinders of 16½-inch bore and 22-inch stroke. It develops 800-horsepower at 300 revolutions per minute. The crank shaft is 10½ inches in diameter and is made of open hearth steel subjected to rigid inspection. Bearings and pins are ground and the entire shaft is machined all over. The shaft is double drilled for lubrication.

Chrome vanadium steel forgings are used for the connecting rods, tubular in section and of six inches outside diameter. Detachable journal boxes of cast steel lined with the best high speed babbit, scraped to fit are bolted to the connecting rods with four steel bolts. There are nine main bearings in the bottom half crank case which is made of cast iron heavily ribbed. The top half of the crank case securely bolted to the bottom half is also of cast iron. There are large hand holes for inspection of main bearings and connecting rod boxes. The water box of cast iron in a one-piece casting is flanged and bolted to the top half of the crank case. Six charcoal iron cylinder liners are inserted in this casting. There is ample water space for cooling the cylinders.

The cylinder liners are made of close grained charcoal iron, machined and ground to mirror smoothness. These liners can easily be removed. The cylinder heads made of close grained charcoal iron cast individually and thoroughly water jacketed are secured to the water box by high carbon studs. There are six removable valve cages in each cylinder head, two for exhaust, two for intake, one for injection, and one for air starting and relief valve. The exhaust and intake valves are identical. These valves are forged of special alloy steel, the head and stem being integral.

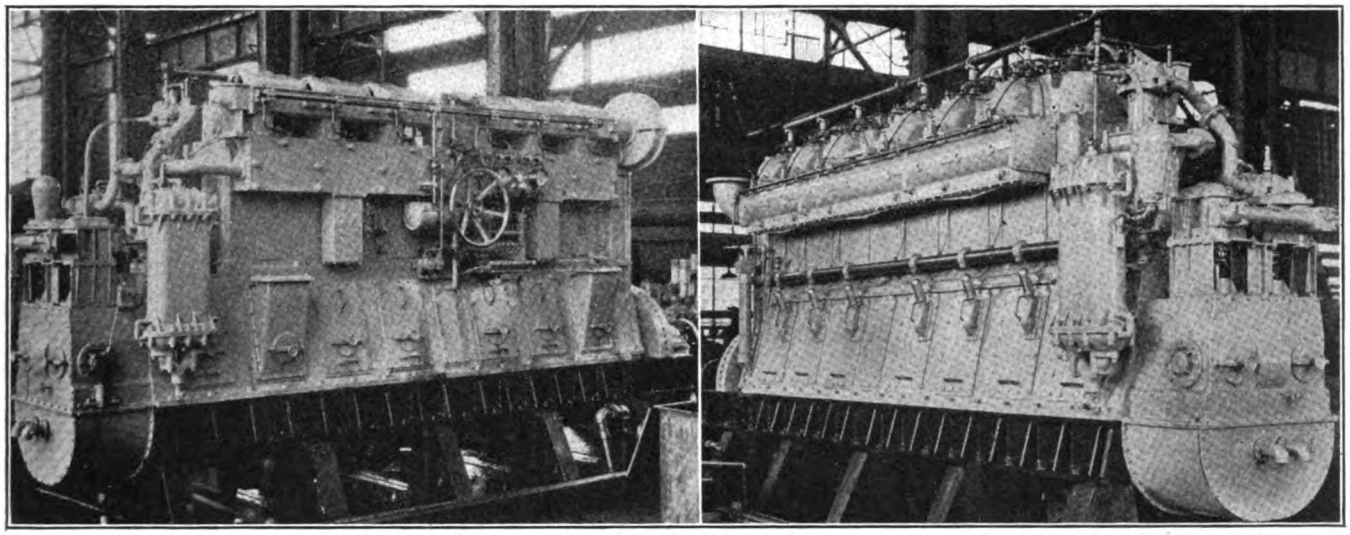
Pistons Of Special Alloy

Pistons made of a special aluminum alloy called bu-nite are exceptionally long and are ground for their full length. Each piston is fitted with six compression rings and one oil scraper ring. The piston pin bearings are carried in the piston and are lubricated by pressure from the main oiling system. This type of construction gives a large bearing surface to the piston pins which is of vital importance as the piston pin bearings are the most severely stressed bearings in an engine. The piston pins are made of a special alloy steel, bored hollow, hardened and ground. Rocker arms are of steel castings, bronze bushed, carrying hardened steel rollers and pins at each end. The crank shaft of high carbon steel is of built-up type, with one set of cams for go-ahead and one for astern. The cams are of carbon steel, drop forged and hardened. Reversing is accomplished by sliding the camshaft in a fore and aft direction. The camshaft is driven by spur spiral at the aft end of crankshaft.

There is a direct connected air compressor at the forward end driven from the main crankshaft. This compressor is of the three-stage progressive type, with inter-coolers between each stage and also an after-cooler. The cylinder is thoroughly water jacketed and removable plates are fitted for cleaning the water space. The injection valve is of mushroom type opening inward and is of the simplest design. There is a six-plunger fuel pump and the fuel consumed by the engine cylinders is metered by a cut-off valve working on suction strokes of the pump plungers. This cut-off valve is in turn regulated by the governor which controls the engine's speed. The governor is controlled by a hand lever and is of the fly-ball type specially designed for and adapted to this engine. The governor is of rugged construction and runs in a bath of oil. It is of the over-speed type and cuts in when the engine speed reaches a pre-determined fixed point.

A reciprocating type, gear driven, circulating water pump of ample capacity to cool the engine is fitted. This pump has Kinghorn valves. The lubricating oil pump is of two-cylin-

(*Continued on Page* 52)

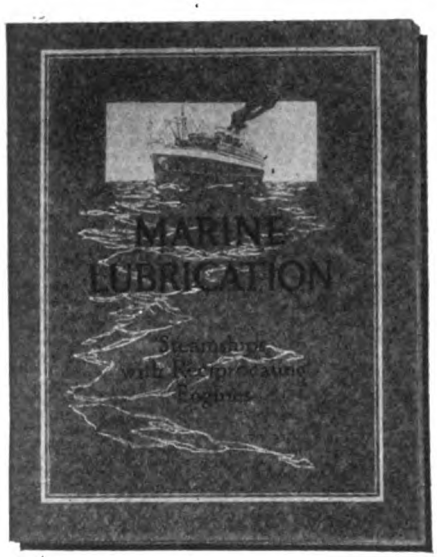


AT LEFT—PORT OR OPERATING SIDE OF THE NEW 800 H.P. WINTON DIESEL ENGINE. AT RIGHT—STARBOARD SIDE OF THE SAME ENGINE—COMPACTNESS AND NEATNESS OF DESIGN ARE CHARACTERISTIC

Reviews of Late Books

MARINE LUBRICATION, an educational paper consisting of 64 pages with three color illustrations, is a wholly new publication by the Vacuum Oil Co. dealing with the lubrication problems of steamships equipped with reciprocating engines. This book contains material that is the result of years of actual experience with the lubrication of marine equipment. It offers the best practice known to lubrication experts in the handling of marine apparatus.

This publication emphasizes the economic significance of lubrication which is sometimes disregarded by the ship operator, much to his detriment in terms of repair bills. It is brought out clearly that much wastage of lubricants can be avoided and that wastage of lubricants usu-



ally goes hand-in-hand with poor lubrication.

Various types of engines are analyzed and the parts that are interwoven with the lubrication problem are treated in very intimate detail. Emphasis is laid upon the results in power saving that will result from proper care of the internal parts and their lubrication. The necessity of sealing the piston against power losses and the piston rods against leakage of steam is described and pictured. The part that lubrication plays in assisting in the performance of these functions is taken up in its proper relationship to the different types of engines, valves, piston rings, and packings.

Main bearing lubrication of reciprocating marine engines is discussed from the standpoint of the operator. It is shown that a scientific method of application by which the oil is fed to the right part of the bearing, has a determining influence on the quantity of oil used and upon the manner in which the oil lubricates the bearing. The engineer who has charge of the maintenance of the main bearings of a marine steam engine or of any bearings, will do well to study carefully the basic principle of film formation applied to such engines as described and illustrated on page 19.

Lubrication of Propeller Shaft

A chapter is devoted to the lubrication of the propellor shaft, with its thrust bearing, stern tube bearing and stuffing box. The service that each part has to perform and the difficulties that may be encountered under actual operating conditions are treated with a view to giving the operator information such that he can avoid these difficulties or overcome them if they should occur.

A subject that has caused much discussion among engineers and much apprehension on the part of marine engineers in particular, is that of oil in the boilers. This is one of the things that must be avoided as oil has a disastrous effect on their operation. The mechanical equipment that is used in separating the oil from the steam is described on page 37. The reduction in heat transfer capacity of the boiler due to oil contamination, the effect of oil floating on the water in the boiler and the influence of oil on the condenser capacity, emphasizes the need for knowing how to avoid and eliminate these troubles, together with all the attendant difficulties.

How to Lubricate Auxiliaries

Deck equipment such as winches, windlasses and capstans require careful treatment in order to have them in constant readiness to perform the service expected of them. The steering apparatus, likewise, requires care and attention that its response may be ready and prompt. The lubrication and care of all this apparatus is adequately described.

Much other information and data is contained within the covers of this new publication, an especially important item being the description of the oils used in marine service, their characateristics and the particular field of usefulness of each one.

The section on "care of lubricants" should be put into service as a means of promoting correct lubrication and of deriving the full benefits from high grade lubricants.

The drawings, most of them in section showing important details, some of them in perspective, and a few of them in phantom, provide a most interesting and instructive feature of the book. With colors, the red indicating oil, and the green indicating water and steam, much that would not otherwise be easily understood, is brought out clearly.

The title of this book is "Marine Lubrication of Steamships with Reciprocating Engines" and it is now available to any of the customers and friends of the company who would like to receive it. In the case of large steamship companies as many copies as are needed for the engineers of the fleet and other members of the personnel will be supplied. Requests may be made through the nearest Vacuum Oil Co. office or directly to headquarters, at 61 Broadway, New York city, care of department C.

River Improvements

The H. C. Frick Coke Co. will open bids in a few days for river improvements to its Palmer mine on the Monongahela river, similar to those at the Alicia mine and which is to cost more than $10,000,000. The contract will include 30,000 cubic yards of dredging and the placing of approximately 20,000 cubic yards of concrete. A new opening will be made to facilitate the removal of coal. This slope is to be 300 feet deep and is to connect with a slope now being driven from the interior.

Continue Shipping Lines

According to a message sent to Charles L. McNary, Salem, Oreg. and R. N. Stanfield, Portland, Oreg., by Chairman O'Connor, the shipping board has no intention of advertising for sale the Oregon Oriental line operated out of Portland by the Columbia Pacific Shipping Co. or to sell the American Oriental Freight service out of Seattle. The board however is deeply concerned with all possible improvement in the operation of these lines with due regard for the local interests and all concerned in the spirit of the merchant marine act.

Easy battery charges and small book charges

At the charging panel a battery should respond to the current quickly and easily. But when it comes to running up charges on your books, a battery should be slow and stubborn.

WHEN you put a charging plug on an Exide-Ironclad Battery for the first time, you'll be surprised to see how quickly, easily and efficiently it takes in current. Its internal resistance is low, so that the plates are charged in a short time and its efficiency is high.

That kind of charging, of course, saves you money. But there are many other ways an Exide-Ironclad trims down your battery costs. For instance, you can cover more ground and handle more freight with this battery. It not only starts out full of pep and speed in the morning, but it still has speed to spare at night. Its voltage holds up well to the end of discharge period, and for that reason the Exide-Ironclad keeps your trucks moving at a good speed *all day long*.

When faced with a steep ramp or extra heavy load an Exide-Ironclad has the peculiar ability to deliver power in a flood, so that it rarely gets stuck. It always has something in reserve when extra power is needed.

An Exide-Ironclad will operate over rough surfaces just as well as on smooth level floors. It is built so rugged that it hardly ever needs repairs. The experience gained in making storage batteries for 38 years has taught us how to build a battery that will stand up for years even under difficult working conditions. And last but not least, the first cost of an Exide-Ironclad is reasonable.

It will be worth your while to find out more about the Exide-Ironclad Battery. Leading steamship companies have cut their handling costs by installing it in their trucks. The names of a few of these companies are reproduced on this page. We will gladly send you our nearest representative without any obligation, or you can write for our booklet, "Facts for consideration in selecting a Storage Battery," Form No. 2865.

Member THE SOCIETY FOR ELECTRICAL DEVELOPMENT INC. Move It Electrically

In average service the storage batteries in your electric industrial trucks and tractors must be charged each day. And each time those batteries also run up charges on your books. Read the interesting story at the left of why the Exide-Ironclad Battery is unusually efficient on both charges.

A few of the many companies that use Exide-Ironclads

Luckenbach Steamship Co. Philadelphia

Eastern Steamship Co. New York

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International Mercantile Marine, New York

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Exide IRONCLAD BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

Exide Batteries of Canada, Limited, 153 Dufferin Street, Toronto

Please mention MARINE REVIEW *when writing to Advertisers*

What the British Are Doing

Short Surveys of Important Activities in Maritime Centers of Island Empire

THE coal strike is reflected in Clyde shipbuilding during July. The number of vessels sent out from Scotch shipyards is only 18, equal to 13,329 tons, making a total for the seven months of only 132 vessels of 187,220 tons as compared with 161 vessels of 357,036 tons in the first seven months of last year. Of the total Scotch output 12 vessels launched in July were built on the Clyde, representing a total of 12,897 tons which compares with 35,897 tons in April. The coincidence that this was the month before the general strike may very fairly suggest that shipbuilding recovery was at that time making steady progress.

* * *

DURING June, orders were placed for 13 new oil engine vessels and contracts signed for the conversion of four steamers to motor drive. Several other important motor ship contracts are pending. During the past year the tonnage of motor ships launched has represented 74 per cent of that of steamers, whereas the proportion three years ago was only 11 per cent.

* * *

OF THE seven vessels provided for in the new shipbuilding program of the Canadian Pacific railway, Clyde shipyards are to build five, including two large passenger liners. The allocation of the fifth contract to the Clyde has just been announced. The builders of the seven vessels are as follows: John Brown & Co., Clydebank and William Beardmore & Co., Dalmuir, two passenger liners, each 13,000 tons gross; the five other steamers of the program are freight carriers each over 10,000 tons and these are divided between Barclay, Curle & Co., Whiteinch, Denny & Bros., Dumbarton, Sir W. G. Armstrong, Whitworth & Co., Newcastle on Tyne, and the two remaining vessels, it is now intimated are to be divided between the firms of Barclay, Curle and Armstrong Whitworth. The complete building program of the Canadian Pacific railway involves an expenditure of about £3,000,000, of which £2,000,000 will go to the Clyde. The cargo steamers are to be delivered by August next year and the liners in 1928. To a large extent this order is anticipatory of the future requirements of this company.

* * *

FURNESS, Withy and Co. Ltd., report a credit balance of £523,044, slightly lower than the previous year. They paid a 5 per cent dividend, with 2½ per cent bonus, to ordinary shareholders, making a total return of 7½ per cent free of income tax. The chairman, Sir Frederick W. Lewis, Bart., mentioned that four large twin screw vessels were contracted for and business was expanding, but the construction of these vessels is being hindered by the coal strike. Sir Frederick added, "It is a matter of the greatest regret that at a time when the shipbuilding industry is laboring in the trough of depression and making great sacrifices and most strenuous efforts to improve its own internal conditions and to meet the competition with which it is faced, it should now be further handicapped by the miners' strike."

* * *

JOHN G. KINCAID & CO., engineers, Greenock, have received an order to supply diesel machinery for three new vessels of large tonnage for British owners. Two of the motor ships are to be built on the Clyde and fitted with single-screw diesel engines. The third, a cargo vessel of 12,000 tons, is to be constructed on the northeast coast of England and fitted with twin-screw diesel engines. The firm has eight sets of diesel engines in hand for four large Furness-Withy passenger and cargo ships ordered from the Blythswood Shipbuilding Co.

What's Doing Around The Lakes

AN ADDITIONAL weekly trip from Chicago to Muskegon, Mich., is being made now by both the GRAND RAPIDS and the ALABAMA, of the Goodrich Transit Co., Chicago, to accommodate pilgrims to Lake Harbor for evangelistic meetings at the Paul Rader camp at the latter point.

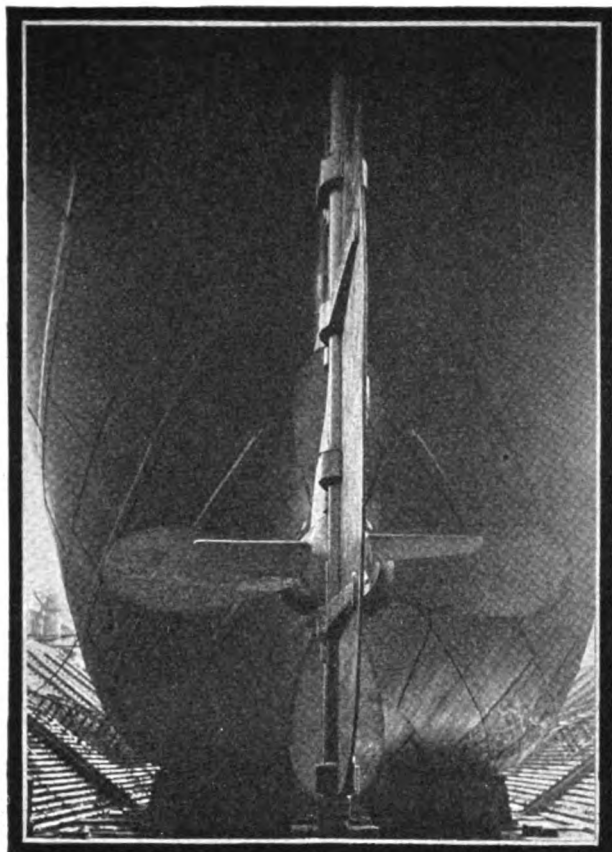
* * *

EARLY public hearings on the project of straightening the south branch of the Chicago river are being urged, as preparations are afoot for complete terminal facilities for water borne commerce in the event the state of Illinois gives permit for the straightening. State officials had threatened to withhold the permit on grounds that Chicago had failed to provide for public water terminals. Mayor William E. Dever, of Chicago, however, has assured the state superintendent of waterways that such a terminal already is under way in connection with the new double deck street, known as Wacker drive, along the river front from Michigan avenue to Lake street bridge, about three-quarters of a mile. Mayor Dever declared the proposed terminal would have a permanent wharfage along Wacker drive, and that the dock area for marine landing is to be 63,690 square feet. The total storage area under cover is described as 71,400 square feet. Total landing area and storage aggregates 135,690 square feet. Only the state permit is lacking for actual start of straightening operations.

* * *

LEADING shipping men of Lake Michigan helped celebrate the seventieth anniversary of organized passenger navigation from the port of Chicago at a fete at the Illinois Athletic club on the evening of Aug. 9. H. W. Thorp, president of the Goodrich Transit Co., who has been with the company 43 years, in reviewing progress of lake travel,

The Contra-Propeller



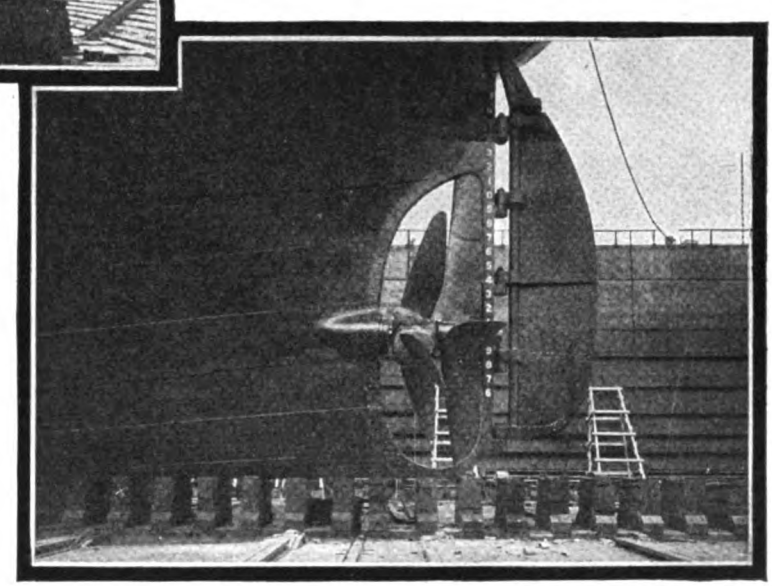
Type of Contra-Propeller installed on Bylayl, Honancy and Freeman of Pocahontas Steamship Co.

THE Contra-Propeller consists of a set of guide blades or vanes so placed that they change the flow of water leaving the driving propeller from a tangential or spiral flow to a direct rearward stream line resulting in a considerable increase in effective propeller thrust and improves steering.

From 10 to 20 per cent reduction in indicated horse power at the same speed has been realized in actual operation. This saving in horsepower has resulted in very material reduction in fuel consumption.

The advantages of the Contra-Propeller, among which are decreased fuel consumption, increased speed, improved steering and maneuvering and less rolling and pitching are too great to be neglected. Let us send you full information about this device together with the results that can be expected on your vessels.

The Contra-Propeller is manufactured in the United States solely by the Bethlehem Shipbuilding Corporation, Ltd., under license from Th. Goldschmidt Corporation, 15 William St., New York City, exclusive representatives for the United States and Canada.



Contra-Propeller installed on S.S. Florence Luckenbach

American vessels equipped with Contra-Propellers

S.S. NORFOLK
S.S. SUFFOLK
Coastwise Transportation Co.
S.S. STEEL NAVIGATOR
S.S. FAIRFIELD CITY
M.S. STEEL CHEMIST
M.S. STEEL ELECTRICIAN
Isthmian Steamship Lines
S.S. DIRIGO
S.S. HARVESTER
The Texas Co.
S.S. SANTORE
S.S. FELTORE
S.S. FIRMORE
M.S. CUBORE
T.S.S. MARORE
T.S.S. STEELORE
Ore Steamship Co.
S.S. HONANCY
S.S. FREEMAN
S.S. BYLAYL
Pocahontas Steamship Co.
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S.S. FLORENCE LUCKENBACH
Luckenbach Steamship Co.
S.S. CALISTOGA
Monticello Steamship Co.
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Bethlehem Transportation Co.
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Standard Oil Co. of N. J.
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PAN AMERICAN
Petroleum & Transport Co.
DIXIE ARROW
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BETHLEHEM
The Contra-Propeller

pointed out that when lake passenger navigation opened from Chicago 70 years ago, the HURON was the only boat operated by the Goodrich company, which was a pioneer shipping concern. It was only a short time later when another vessel was added. This company now has 12 large passenger vessels operated from company wharves.

* * *

A HEAVY offshore fog on July 17 caused the steamer J. S. ASHLEY, carrying 10,000 tons of iron ore and headed for the Gary works dock, at Gary, Ind., to become embedded in a sand shoal off Indiana Harbor, Ind. The ship was able to clear with little damage.

* * *

JULY surpassed June in iron ore tonnage received at Gary, Ind., the total having been 830,190 carried in 115 ships. June's tonnage was 788,595 in 116 vessels. July also topped June in limestone shipments, with 167,761 tons as against 157,870 in June.

* * *

CONSIDERABLE criticism has developed from the announced policy of new regulations from Washington that would abolish the registration of ships and their clearances in the district. Some of the shipping authorities hold that this will result in confusion and a lack of shipping data that will be felt keenly.

* * *

EXCURSION steamers of the Goodrich Transit Co., plying between Chicago and Milwaukee, St. Joseph, Benton Harbor, South Haven, Grand Haven, Muskegon, Holland, Michigan City and other points will be discontinued on Sept. 7, but services will be continued by the company to each of its ports.

Ocean Freight Rates

Per 100 Pounds Unless Otherwise Stated

Quotations Corrected to Aug. 12, 1926 on Future Loadings

NOTE: FREIGHT RATES STEADY AND SOME INCREASE

New York to	Grain	Provisions	Cotton (H. D.)	Flour	General cargo cu. ft.	General cargo 100 lbs.	††Finished steel	REMARKS Freight Offered
Liverpool	2s 6d	$0.50	$0.35	0 20	$0.40	$0.75	$7.00T	Fair
London	2s 3d‡	0.50	....	0.20	0.40	0.75	7.00T	Fair
Oslo	$0.15	0.45	0.50	0.27	0 42½	0.85	7.00T	Dull
Copenhagen	0.14	0.45	0.40	0.26	0.42½	0.85	7.00T	Dull
Hamburg	0 11	0.35	0.40	0 18	0.37½	0.75	8.00T	Fair
Bremen	0.11	0.35	0.40	0.18	0.37½	0.75	8.00T	Fair
Rotterdam and Amsterdam	0.12	0 32½	0.45	0.18	0 35	0 70	7.50T	Fair
Antwerp	0.09	0.32½	0.35	0.18	0.35	0.70	7.50T	Fair
Havre	0.11	0.50	0.35	0.27½	0.40	0.75	8.00T	Slow
Bordeaux	0.11	0.50	0.35	0.27½	0.40	0.75	8.00T	Slow
Barcelona	....	12.00T	0.30	10.00	—12 00T—		8.00 to 15.00T	Quiet
Lisbon	....	0.65	0.40	7.00T	—20.00T—		7.00T	Slow
Marseilles	....	0.55	0.30	6.00	—20.00T—		5.50T	Slow
Genoa	0.15	12.50	0.40	7 00	—20 00T—		10 00T	Fair
Naples	0.15	12.50	0.40	7.00	—20 00T—		10.00T	Fair
Constantinople	0.27	17.00T	0.75	0.40	—20.00T—		9.00T	Good
Alexandria	....	17.00T	0.75	0.40	—20.00T—		9.00T	Good
Algiers	....	0.75	0.50	0.40	—20 00T—		10.00T	Fair
Dakar	....	15.00	....	14.00T	—21.00T—		10.50T	Good
Capetown	8.00T	18.00	....	13.00T	—20 00T—		11.00 to 18 00T	Fair
Buenos Aires	....	20.00T	....	....	—20.00T†		8.00T	Good
**Rio de Janeiro	....	22.00T	....	8.00T	20.00 to 22.00T†		7.00 to 7.70T†	Good
Pernambuco	....	22.00T	....	9.00T	—22.00T—†		9.70T†	Good
Havana	0.22½*	0.50	....	0.25*	....	....	4 00*	Quiet
Vera Cruz	....	0.30	0.35	0.25	0.52½	1.05	0.30 to 0.35	Quiet
Valparaiso	....	1.07	....	0.70	0.45	0.80	10.00T	Good
San Francisco	....	0.35 to 0.70	....	0.50 to 1.10	....	....	0.25 to 0 80	Fair
Sydney	....	18.00T	1.25	1.18T	18.00-24.00T		9.00-12.00T	Fair
Calcutta	....	....	0.45	10.00T	—16.00T—		10.00T	Slow

T—Ton. ‡Per quarter of 480 lbs. †Landed. ††Heavy products limited in length. *Extra charge for wharfage.
**Plus $0.50 surcharge on all rates to Rio de Janeiro on account of congestion.

From North Pacific Ports to	Lumber Per m. t.
San Francisco	$4.00 to 4.50
South California	4.50 to 5.00
Hawaiian Islands	9.50 to 10.50
New Zealand	16.00 to 18.00
Sydney	13.00 to 13.50
Melbourne-Adelaide	13.00 to 14.00
Oriental Ports	9.50 to 11.00
Oriental Ports (logs)	12.50 to 16.00
Peru-Chile	12.00 to 13.50
South Africa	16.50 to 18.00
Cuba	14.00 to 15.00
United Kingdom	75s to 85s
United Kingdom (ties)	70s to 80s
Baltimore-Boston range	$11.50 to 13.00
Florida Range	No rates
Buenos Aires	14.00 to 15.00
	Flour and Wheat
U. K. and Continent (gross ton)	29s to 33s
Oriental Ports (net tons)	$4.00 to 4.50

Principal Rates To and From United Kingdom

	s	d		s	d
Grain, River Plate to United Kingdom	25	6	Pig iron, United Kingdom to New York or Philadelphia	12	6
Coal, South Wales to Near East	—	–	Iron ore, Bilbao to Cardiff	5	10
Coal, United Kingdom to Buenos Aires	—	–	Iron ore, Huelva to Phila. or Balto	11	3
Manganese Ore, Poti to Philadelphia	$3.70				

NOTE: Lighterage rates on fuel in New York reduced from 6½ to 5½c per barrel. Owing to the coal stoppage in Britain no outward freight rates or bunker prices for coal or pig iron are quoted.

General cargo rates to Havana change daily and are omitted for the time being.

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Sept. 19, 1925	5.50@6.00	1.71½	5.00c
Oct. 17	5.00@6.00	1.70½	5 00
Nov. 18	5.50@5.60	1.70½	5 00
Dec. 18	5.60	1.70½	5.00
Jan. 2	5.50@6.25	1.75@1.80	5.25
Mar. 18	5.60@5.80	1.80½	5.50
Apr. 22	5.25@5.60	1.80@1.81½	5.75
May 19	5.25@5.60	1.80½	5.88
June 18	5.50@5.60	1.80½	6.08
July 20	5 00@5.60	1.80½	6 08
Aug. 12, 1926	5.00@5.60	1.81½	6.10

At Philadelphia

	Coal trim. in bunk per ton	Fuel oil alongside per barrel	Diesel Eng. oil alongside per gallon
Oct. 17, 1925	5.25@5 50	1.71½@1.74½	5.15@5.65c
Nov. 18	5.40@5.65	1.71½@1.74½	5.15@5.25
Dec. 18	5.15@5.50	1.71@1.74½	4.89@5.15
Jan. 20	5 50@6.25	1.71@1.79	5.00@5.65
Feb. 18	5.80	1.78@1.86½	5.14@5.50
Mar. 18	5.00@5.25	1.80@1.86½	5.40@5.65
Apr. 22	5.25	1.77@1.86½	5.90@5.93
May 19	5 25@5.70	1.82@1.86½	6.15@6.38
June 18	4 90@5 15	1.80@1.86½	6.15@6 43
July 20	5 10@5.50	1.74@1 81½	5.09@6 15
Aug. 12, 1926	5.00@5.25	1.69@1.74½	5.75@6.17

Other Ports

Boston, coal, per ton	$8.30
Boston, oil, f. a. s., per barrel	$1.83
Hampton Roads, coal, per ton, f.o.b., piers	5.00
July 9 — Cardiff, coal, per ton	—s –d
London, coal, per ton	—s –d
Antwerp, coal, per ton	—s –d
Antwerp, Fuel oil, per ton	77s 6d
Antwerp, Diesel oil, per ton	97s 6d
British ports, Fuel oil	72s 6d
British ports, Diesel oil	87s 6d

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	493	1,943,133	546	2,251,396
June	542	2,337,678	563	2,279,208
May	448	1,856,777	538	2,126,788
April	483	1,967,964	538	2,248,081
March	523	2,090,347	511	2,033,938
February	404	1,591,273	454	1,826,886
January	407	1,671,761	463	1,883,094
December	431	1,706,900	510	2,022,775
November	473	1,902,745	488	1,886,587
October, 1925	450	1,920,797	530	2,229,801

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	92	191,680	69	128,381
June	104	229,631	56	109,561
May	97	215,829	69	151,287
April	80	185,401	61	135,919
March	107	264,754	72	158,858
February	78	184,715	52	113,763
January	76	206,081	52	136,040
December	83	194,283	53	142,885
November	83	216,604	44	116,468
October, 1925	74	193,534	49	128,906

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	152	336,135	108	274,513
June	164	379,526	109	262,468
May	134	277,009	111	261,878
April	101	285,245	77	210,542
March	117	356,432	62	173,217
February	92	263,475	42	136,613
January	97	287,335	55	156,167
December	96	270,869	67	210,652
November	115	341,258	59	147,554
October, 1925	105	312,455	73	206,347

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	27	47,885	26	47,569
June	29	44,390	29	46,942
May	19	49,894	17	47,016
April	23	48,836	32	73,947
March	34	97,413	31	88,462
February	23	64,150	23	66,660
January	26	78,508	27	81,917
December	31	85,651	29	75,072
November	25	35,616	23	33,194
October, 1925	17	27,630	20	34,668

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	7	29,207	5	18,641
June	5	17,954	3	8,355
May	7	25,057	6	20,806
April	8	28,449	5	23,480
March	15	47,557	8	34,025
February	8	29,622	7	30,033
January	5	20,355	6	24,221
December	16	52,660	6	27,149
November	6	16,446	8	26,811
October, 1925	9	35,405	6	21,232

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	24	93,977	33	127,270
June	22	77,850	45	156,103
May	35	128,351	43	152,890
April	17	66,789	29	107,892
March	21	85,073	38	134,432
February	23	81,440	33	114,147
January	22	84,722	26	97,068
December	23	86,443	40	144,392
November	28	108,796	37	140,784
October, 1925	26	98,371	41	144,397

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	211	644,261	202	603,648
June	138	402,230	132	371,781
May	120	369,729	121	355,443
April	107	330,401	110	326,649
March	120	382,983	119	362,256
February	102	304,714	99	288,640
January	97	302,341	88	264,249
December	105	314,958	109	332,721
November	106	334,997	99	312,705
October, 1925	99	302,522	92	293,425

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	267	727,374	309	854,305
June	78	215,803	171	502,701
May,	40	107,858	140	368,515
April	21	45,875	126	305,549
March	22	40,160	140	395,033
February	20	48,377	108	298,756
January	26	69,958	96	256,019
December	24	57,907	100	279,570
November	27	78,573	81	254,439
October, 1925	26	51,328	91	248,017

Savannah

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
March, 1926	43	102,126	41	99,244
February	40	97,908	46	121,792
January	38	103,029	38	106,472
December	37	101,726	35	91,141
November	37	112,158	38	117,064
October	45	125,766	47	126,452
September	50	137,030	39	103,408
August	34	77,027	39	87,455
July	38	97,332	34	91,981
June, 1925	26	60,788	27	60,924

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	78	86,124	77	86,323
June	94	110,100	94	108,581
May	114	126,089	109	120,597
April	88	101,331	88	99,227
March	102	117,292	90	114,917
February	70	85,607	69	88,229
January	80	110,684	81	110,084
December	89	121,193	88	113,996
November	96	113,222	89	107,091
October, 1925	77	91,125	75	90,953

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	86	153,642	84	159,256
June	89	168,610	89	163,318
May	99	183,795	95	191,442
April	109	205,035	98	178,025
March	125	228,481	115	221,022
February	100	153,884	92	188,057
January	109	212,005	78	150,384
December	104	183,941	89	173,371
November	101	191,490	95	185,722
October, 1925	88	258,529	84	161,648

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	35	146,670	31	126,407
June	39	165,989	42	181,090
May	39	159,755	44	163,718
April	51	215,641	47	191,161
March	38	166,536	45	184,067
February	42	168,308	45	182,920
January	45	182,889	50	204,058
December	47	201,460	55	231,787
November	47	199,055	46	196,343
October, 1925	52	203,951	49	207,153

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	263	716,066	270	739,005
June	255	658,385	221	665,960
May	287	753,621	284	772,138
April	248	626,277	296	694,673
March	295	754,863	300	751,054
February	255	717,048	250	691,747
January	241	659,776	243	652,209
December	273	750,625	279	764,022
November	261	645,709	232	629,728
October, 1925	252	729,058	276	789,419

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
July, 1926	13	37,020	13	33,908
June	8	27,095	10	30,601
May	5	18,321	10	20,514
April	11	37,459	12	27,166
March	18	64,432	20	49,897
February	10	35,629	10	21,945
January	8	27,610	13	27,237
December	14	38,441	10	26,597
November	17	50,093	13	31,111
October, 1925	22	68,795	21	55,903

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1926	39	89,426	71	208,388
January	36	92,194	75	235,699
December	38	83,590	97	300,872
November	34	107,440	83	266,458
October	43	98,168	96	302,581
September	33	95,954	72	225,194
August	28	80,524	41	133,058
July	36	100,359	52	141,816
June	47	120,423	57	177,647
May, 1925	46	114,702	53	151,098

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	127	460,296	103	352,367
June	123	349,936	88	344,187
May	133	376,720	112	351,123
April	149	434,866	130	370,158
March	139	371,793	128	305,106
February	119	363,875	111	306,161
January	130	381,785	115	335,041
December	149	392,707	109	310,852
November	181	398,459	123	337,483
October, 1925	261	365,552	183	268,611

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	160	523,527	102	495,849
June	142	561,774	100	419,036
May	154	605,068	116	428,814
April	155	583,821	167	602,680
March	144	571,040	135	511,010
February	133	506,778	134	506,317
January	154	544,882	139	528,315
December	135	532,691	153	593,556
November	124	491,579	142	547,770
October, 1925	138	517,798	136	511,844

Port Arthur

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1926	25	79,464	32	98,637
June	22	70,743	30	97,056
May	20	60,276	36	95,754
April	32	95,592	38	108,923
March	28	87,715	37	101,830
February	21	65,930	32	70,814
January	23	75,232	32	108,118
December	31	86,254	24	71,883
November	40	117,506	42	120,597
October, 1925	30	86,652	32	95,695

Build Up a Marine

(*Continued from Page* 12)

and Europe. The mail steamships ST. LOUIS, ST. PAUL, and NEW YORK were practically all we had last year on the North Atlantic."

After the free admission of ships under the Panama canal act of 1912 and the act of August, 1914, and even before the entrance of the United States into the World war there was some increase, namely, from 1912 to 1917. Since that time, of course, statistics have little value by reason of the abnormal conditions under which the American merchant marine increased. According to Lloyd's Register for 1905 and 1906, of vessels above 100 tons, engaged in foreign trade, England and her colonies had a tonnage of over 17,000,000; Germany, 3,500,000; France, 1,725,000; Italy, 1,190,000; the United States, less than a million. From 1901 down to 1907 it appeared that not a single vessel for the foreign trade was laid down in an American shipyard. The reasons for the decline of American foreign shipping since the departure from the protection policy in 1830—leaving aside the few subsidy measures to be mentioned below—are variously described by different authorities, but can probably be brought down to the following grounds:

Reasons for Decline

1. The change from wooden to iron and later to steel ships. The advantages which the United States had in cheap wood and skillful building was overcome in the late thirties by England's advantage with iron. The United States devoted its chief attention to wooden ships as late as 1848, although the iron ship had then established itself firmly. While the demand for wooden ships was stimulated by the gold discoveries of 1849 in California, that demand was temporary only. By reason of tariff restrictions the United States was not able, at least until recent times, to overcome Great Britain's advantage in the building of iron and steel ships. A further reason for the decline of wooden ships was the discrimination of Lloyd's against wooden vessels. They were put into a less favorable class, making it to the advantage of a shipper not to use the American-built wooden ship. Since 1860 the advantage in cost of ship construction has been with Great Britain, while before this, by reason of the popularity of the wooden ship, it lay with the United States.

2. The Civil war and the inroads of the Confederate cruisers brought about not only a destruction of much American shipping but an inducement to transfer a larger part of it to a foreign, principally the British, flag. Nevertheless, until 1870 American ships were still carrying about one-third of the Nation's foreign commerce, the proportion since then having rapidly declined.

3. Both labor and capital have been attracted to other more lucrative fields of employment. The opening of the West took the interest of the United States away from navigation to the internal development of the country. Railways, manufacturing, and industry generally commanded high rates of return without apparent risks, which were considered unavoidable in shipping. Shipping offered a less attractive investment for capital after 1860 than before that time.

4. A most effective cause for the decline was the protective tariff, which by stimulating American manufactures had induced capital to enter that field. The unprotected shipping industry naturally suffered for lack of capital. The price of shipbuilding materials was naturally increased by the tariff. Steel plates in 1903 were selling for $41.40 in America, $25.50 in England, and $30.23 in Germany. In 1904 the price in England was $27 and in the United States $35 to $40 per ton. Even the more recent free admission of shipbuilding materials hardly helped American foreign trade, because until August, 1912 when the Panama canal act was passed, it was a condition of the free admission that the vessels could not be used in the coastwide trade more than two months in any one year, except on payment of the duty. Moreover, that condition made the ship difficult to sell. After 1912 the vessel built of foreign materials could be employed all the year in the coastwise trade, but the effect of the amendment upon shipbuilding has probably not been great. The provision was repealed by the tariff act of 1922.

The tariff has restricted the number and amount of cargoes that American ships could bring from foreign ports. That condition will always be present in the face of a high tariff. The price of labor has also been higher in the United States, but the testimony introduced before various commissions would indicate that the increased cost of manning an American vessel has been greatly exaggerated, amounting to not more than 10 per cent. Increased costs of labor in shipbuilding, of course, exercise a more material influence on the total cost of construction, and that has been a handicap to American shipbuilders. There is no evidence of superiority of the American over the British worker in shipbuilding.

5. The American registry law, which until 1912 prohibited free ships, necessarily operated to further the decline of shipping under the American flag. The law, of course, was prompted by the apparent necessity and desire to maintain the American coasting trade for American-built ships and to preserve that trade for the shipbuilding industry. The effect of the seamen's act and prior provisions regarding a proportion of American officers and the maintenance of certain food scales has probably been exaggerated.

Large Dry Dock Ready

(*Continued from Page* 16)

of 12 feet per minute. The large capstan at the head of the dock gives a line pull of 65,000 pounds at a speed of 12 feet per minute.

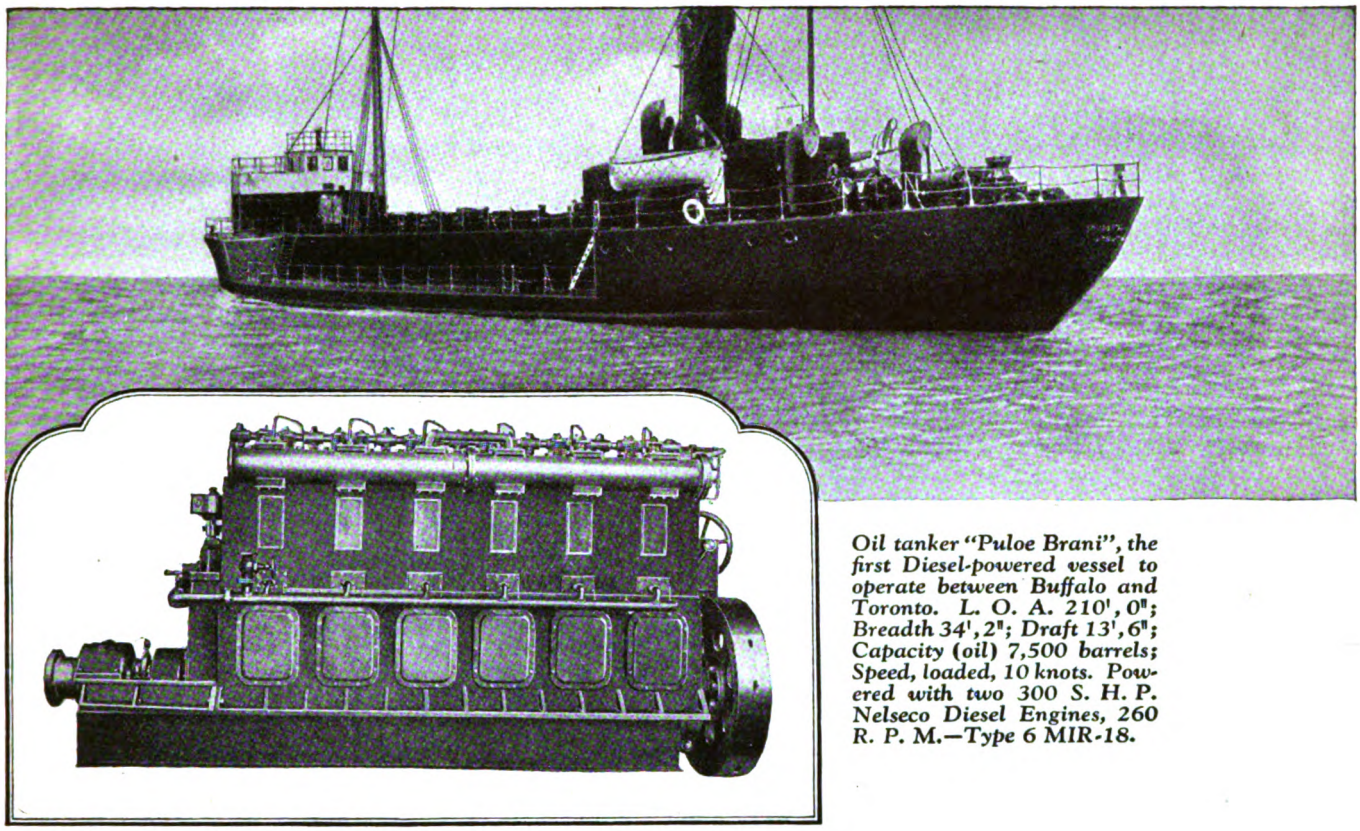
Machine shops and modern repair facilities are provided on the property, as this dock will be the Pacific naval base for the Royal navy. Esquimalt harbor is land-locked with good deep water, having an area of approximately two square miles, and possesses exceptionally good holding ground. Adjacent to the dry-dock is the ship repair plant of the Yarrows Ltd., equipped to do repairs on any class of vessels.

Opposite the new dry-dock is the old dry-dock. This was originally constructed in 1887 by the joint efforts of great Britain, Canada and the Province of British Columbia. This dock is in excellent condition for serving commercial vessels. It is 450 feet long and 65 feet wide and has a depth of 29 feet of water on the sills at high tide.

Powerful Crane Equipment

The contract for the electrically-operated. traveling, revolving boom hammerhead crane for the new dry dock was awarded to the Colby Crane & Engineering Ltd. of Vancouver, B. C. which is associated with the Colby Steel & Engineering Co. of Seattle.

The crane will have a clear height over the coping wall of 50 feet and a reach of hook over the dock of 99 feet 2 inches. This carries the 25-ton hoisting hook 5 feet beyond the center line of the dock. An auxiliary hoisting unit is provided on the crane having 5-ton capacity. The 5-ton auxiliary hoist will reach 9 feet from the center line of the dry dock. This gives the crane ample power.



Oil tanker "Puloe Brani", the first Diesel-powered vessel to operate between Buffalo and Toronto. L. O. A. 210', 0"; Breadth 34', 2"; Draft 13', 6"; Capacity (oil) 7,500 barrels; Speed, loaded, 10 knots. Powered with two 300 S. H. P. Nelseco Diesel Engines, 260 R. P. M.—Type 6 MIR-18.

Through 25 locks and a winding, tortuous stream

THE tanker "Puloe Brani", which supplies Toronto with gasoline, travels a most unusual and difficult route.

Leaving Buffalo with a cargo of crude oil, this vessel navigates slowly down the winding, tortuous Buffalo Creek, spanned with several draw bridges; then crosses Lake Erie; then passes through the Welland Canal with its chain of 25 locks in 15 miles; and then crosses Lake Ontario to the storage tanks of McColl Bros., Ltd., on the outskirts of Toronto.

This trip, on account of the difficult service, requires frequent and quick maneuvering. But with her twin Nelseco Diesel Engines, the "Puloe Brani" handles herself as easily as if she were a tug boat instead of an ocean-going tanker.

Not only do the two 300 S. H. P. Nelseco Diesel engines handle quickly, but their installation has meant a remarkable saving in fuel costs. On block tests these engines showed a fuel consumption of only .39 lbs. per horse-power hour.

Nelseco engineers will be glad to tell you about other interesting Nelseco Diesel installations. In writing ask for Pamphlet MR, which describes the latest types of Nelseco Diesel Engines.

Nelseco Diesels are built under M. A. N. patents; in 4-cycle, single-acting type, from 100 to 850 H. P.; in 2-cycle, double-acting type, from 1,000 to 10,000 H. P.; mechanical or air injection; suitable for direct current, alternating current, rope, belt or direct drive.

A 180 H. P. Nelseco Diesel is conveniently placed for your examination at our sales office.

PORT ELCO
247 Park Ave., New York, N.Y.
Demonstrations made on appointment

NEW LONDON SHIP & ENGINE COMPANY
Groton, Conn., U. S. A.

NELSECO

Original licensees from and collaborators with M. A. N. since 1910

Fire Menace on Ships

(Continued from Page 15)

ords indicate that the majority of fires aboard vessels originate in these compartments. It appears that the contemplated revised rule will alter this condition to some extent, but it would be desirable if the rule were still more specific as to the locations aboard ships that should be protected against fire.

Definite Features Suggested

Other features should be taken into consideration in order to establish uniform practice, some of the more important of which are as follows:

(a) *Fire alarm system circuits should be used for the exclusive purpose of transmitting fire signals.*

(b) *Fire alarm systems should indicate the presence of excessive temperature, at both the pilot house and engine room.*

(c) *Indications of fire should be made both audibly and visibly.*

(d) *Fire alarm systems should be fully automatic and should be required for the protection of all parts of every type of passenger-carrying vessels, and should be capable of the successively repeated signals.*

(e) *Thermostats or detectors should be installed overhead in the compartments protected.*

(f) *Not more than ten staterooms should be allowed on a fire alarm circuit or zone or individual annunciating indicator.*

(g) *In case of large compartments, detectors or thermostats should be installed for every* 144 *square feet of area.*

(h) *Fire alarm mechanism for use at sea should be made of nonferrous material as far as possible, and where not practicable other materials should be treated against corrosion.*

(i) *All electrical contacts should be made of coin silver or platinum.*

(j) *Fire alarm systems should be under constant electrical supervision other than the trouble circuit and the trouble signal should operate continuously until manual attention has been applied.*

(k) *Fire alarm detectors or thermostats should be sealed against contaminating dirt or vermin.*

(l) *Provisions should be made for the efficient testing of fire alarm systems.*

(m) *Fire alarm systems should be energized by a potential of not less than* 20 *volts.*

(n) *A continuous source of current supply, such as duplicate sealed storage batteries with proper charging equipment should be available at all times.*

If a ruling were made, predicated on the fundamentals outlined above, owners and operators of vessels would be sure of obtaining efficient fire alarm systems, and uniform practice in installation methods, which would, undoubtedly curtail the enormous fire loss to vessels and cargoes. Further, it would insure uniform fire alarm installation approvals in all inspection districts, and insurance companies should make due allowance in rates because the risk in ships so equipped would be materially lessened.

The foregoing, where it has to do chiefly with present and proposed rules governing automatic fire detecting and alarm systems, must not be considered, even if adopted in its entirety, as a panacea for all ills occasioned by the most hazardous condition at sea, namely, that of fire. No piece of equipment, whether the engine, steering gear, telephone, compass, or what not, is more efficient than the operating personnel charged with its maintenance and upkeep. As it is necessary to properly maintain the machinery of the vessel, so is it necessary to properly care for any type of fire alarm system.

It, therefore, becomes essential that a proper test and inspection of a fire alarm system should be made once a month, and preferably before each sailing of the vessel.

The design of automatic fire alarm systems today permits an inspection being conducted very quickly and thoroughly, and it should not impose a hardship upon any owner or operator. Experience has demonstrated in the case of all types of inspection work, whether ashore or afloat, that the most efficient inspection work is performed when conducted by the personnel of an organization that makes a specialty of such work, submitting their reports to the proper authorities. This is not intended as a reflection on the operating personnel of any ship. So many of the vessels of American registry do not carry electricians that the time of the engineer, who must in addition to his regular duties maintain the electric lighting and power plant of the ship, is so limited that it is physically impossible for him to give personal attention to the inspection and upkeep of fire alarms, telephones, and such apparatus of a technical nature which require a proper knowledge of the equipment to obtain the best results.

The present rules governing automatic fire detecting and alarm system and installation, will probably remain in force until the next annual meeting of the board of supervising inspectors. At this time, the study now being made by the department of this most important subject, will no doubt be concluded.

If the new rules, which will undoutedly be issued thereafter, contain the fundamental requirements, some of the most important of which are suggested herein, many lives may be saved as well as the untold property losses now resulting from fire.

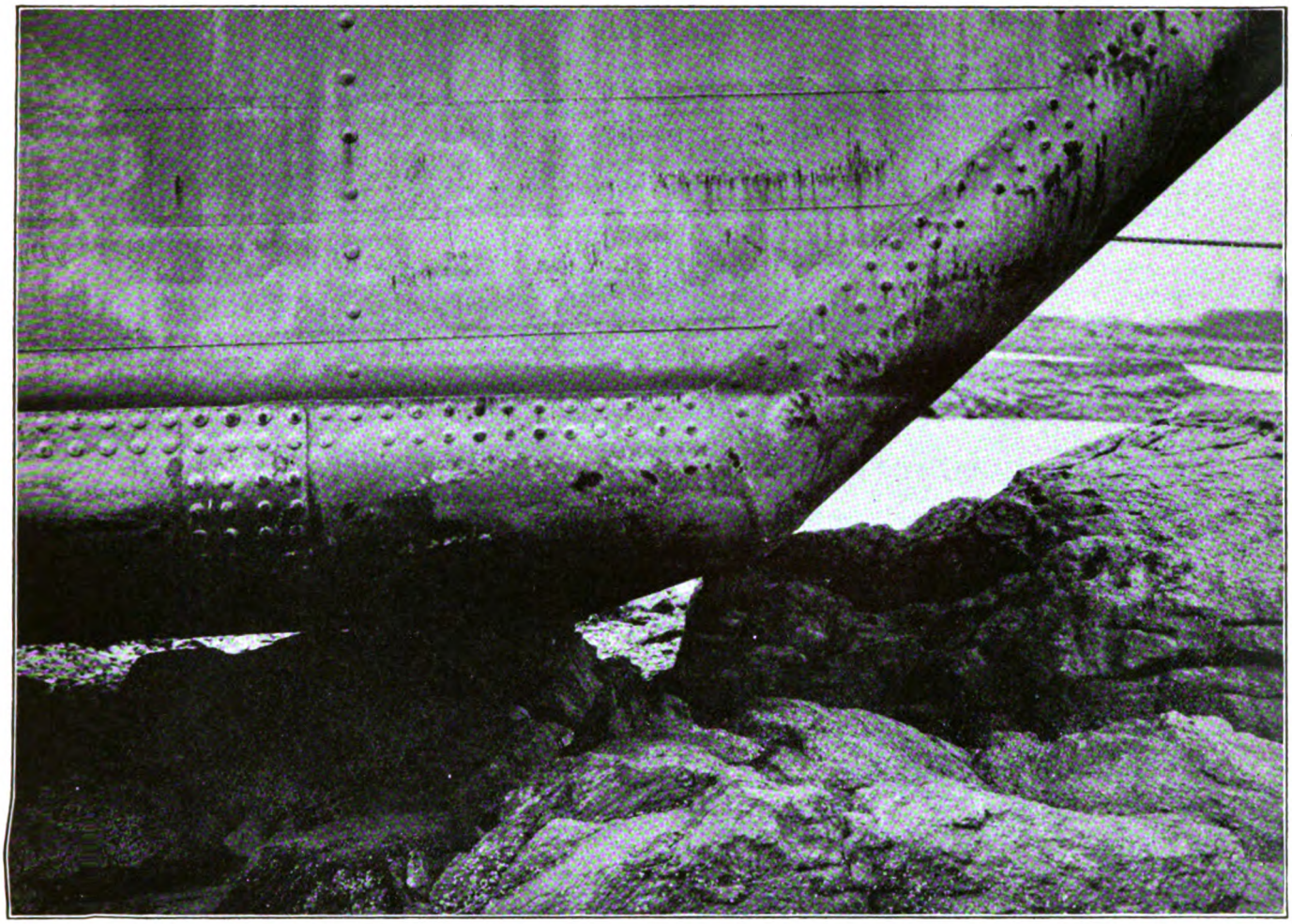
Honor American Tanker

IT IS pleasant to know that the skill, courage and unselfish devotion to duty on the part of American seamen sometimes gets the recognition deserved. On Aug. 26, Captain Maxwell and the crew of the tanker S. S. W. W. MILLS were honored by the officials of the Pure Oil Co. owners of the vessel and a number of prominent persons from civil and government circles.

The W. W. MILLS under command of Captain Maxwell rescued five men from the schooner SIMMONS as she was sinking during a severe storm off the Florida coast. On a previous occasion the MILLS under command of Capt. D. Evans rescued five survivors of the ill-fated Norwegian RUNA.

Director of public safety George P. Elliott presented a medal for valor to Captain Evans, who comes from Philadelphia, commemorating the RUNA rescue. Admiral Billard commandant of the United States coast guard presented similar medals to Captain Maxwell and the members of the crew actually participating in the rescue of the crew of the SIMMONS. The presentation took place following a luncheon at Ritz-Carlton hotel, in Philadelphia.

As a permanent record of the skill and bravery of the officers of the MILLS in maintaining American traditions of the sea, a bronze plaque was placed on board the tanker, W. W. Mills vice president of the Pure Oil Co. officiating at this ceremony on board the tanker at pier 34 South.



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This New York Central Barge was torn loose from her tow and piled up on David's Island, L. I., in one of the worst gales of recent years. She pounded in over shoals and rocks. She landed askew with three sharp rocks carrying her entire weight. Heavy seas battered her for hours.

Yet she was floated off and towed to New York without springing a leak. Not a line in the hull structure was deflected. Not a seam was opened. Not a single rivet was loosened.

Such a demonstration of strength and seaworthiness suggests the reason for repeat orders from the New York Central. Other outstanding advantages are described in a Bulletin which will be sent to anyone interested in this practical type of construction approved by the American Bureau of Shipping. Write for a copy.

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ELLIS SYSTEM

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Oil Separators

(*Continued from Page* 21)

pollution will meet at Washington on June 8 (while this paper is in the printer's hands), and it is anticipated that the necessity for prohibition of the discharge of all oily bilge water will be recognized by the conference.

Since bilge and ballast waters must necessarily contain some oil, the necessity for an efficient form of oil separator to be used for the discharge of all such waters is imperative.

Efficient separators are available, and there is no reason why they should not come into general use, for the value of the oil recovered will pay for the cost of installation in a few months, and the expenditure involved means no hardship to the shipowner, but the reverse.

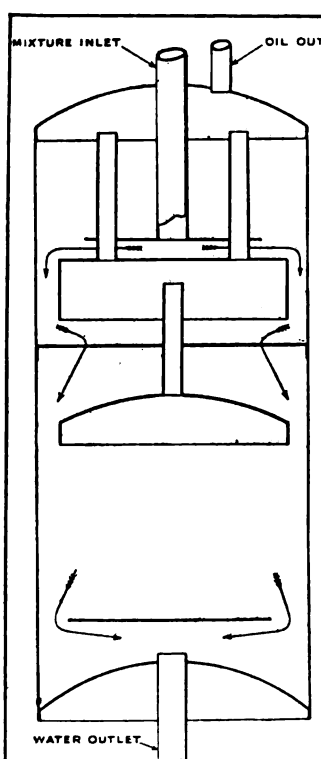

FIG. 11.—C. S. LENZ AND G. E. JUPP'S PATENT OF 1922.

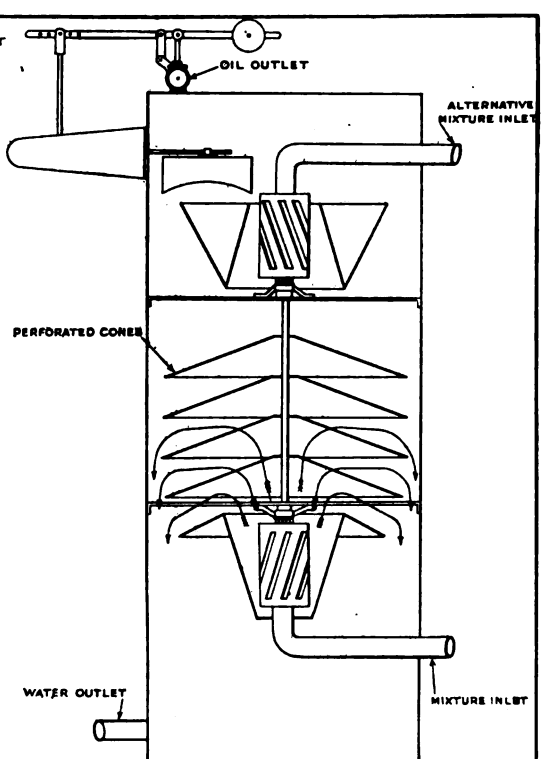

FIG. 12.—THE "H. AND H." DEHYDRATOR. P. P. HARVEY AND H. J. HOLFORD'S PATENT OF 1924.

What a Separator Should Do

It should be noted as a further recommendation for the use of an efficient separator that it removes any objection to the use of the fuel tanks, when empty, for ballasting purposes—a practice which may make in some cases all the difference between profit and loss on the running of the ship, in view of the greater cargo-carrying capacity thus made available.

Before considering the actual question of separator design, it is desirable to outline the requirements of a useful and efficient separator. Having regard to capacity, large vessels may carry two thousand or more tons of oil fuel, and if something like one-half of the fuel tanks are assumed to be ballasted, it is obviously desirable to be able to discharge those tanks at a rate of, say, one hundred tons per hour. Thus, for ship installations a separator should have a capacity to suit the ship, and should not be excessively bulky for large capacities of the order mentioned. In default of separators fitted in every ship, harbor service barges must be equipped, and for these a capacity of two hundred tons per hour, or more, is desirable. Even with such capacities there is likely to be delay at the ports if many vessels rely on the barge service, and the installation of a smaller separator on each ship is the more convenient arrangement.

As to the quality of the water discharged, it is essential that a certain standard of purity be reached and maintained. One part of oil in ten thousand of water means over twenty gallons of oil discharged per thousand tons of water—a very undesirable quantity, capable of producing an iridescent film over a large surface of water. A considerable body of opinion supports the enforcement of a standard to ensure only one part of oil in a two hundred thousand of water. To secure this standard a scientifically designed plant is necessary, but the standard can be and is attained by separators of moderate size and price, and may therefore be regarded as a reasonable one.

The standard is not reached by the use of a gravity separator alone, but by the combination of such plant with a filter which will remove the last fine traces of oil.

Reference will be made to the filtering process later, but for the moment attention will be given to the design of the preliminary separator.

Principles of Separator Design

The separation of the bulk of the oil from bilge and ballast water can be effected by gravity, advantage being taken of the difference in density between oil and water. With the heavier grades of oil this difference is small, which makes it essential that the apparatus should be carefully designed, since otherwise the size necessary becomes so great as to be prohibitive. In view of the large volumes of oily water to be dealt with, an attempt to employ the method of centrifugal separation in order to increase the effect of the difference in density of oil and water is hardly practicable, and the trend of development has been to retain the gravitational process while seeking to ensure the best possible conditions in its application.

The general principles involved in a sound method of construction appear to be comprehended in the following review.

1. The lesser specific gravity of the oil tends to carry it vertically through the water. The velocity at which it rises depends on density and viscosity, and on the size of the oil globules.

Small globules rise slowly, so that if the flow of the water is arranged to be vertically downwards those particles of oil whose relative velocity due to buoyancy is less than the velocity of the water will necessarily be carried away to the water discharged, however long the passage. If, on the other hand, the water flow is arranged horizontally, all particles having any tendency to rise at all can be separated if the passage is made long enough. The most efficient separators will therefore be those in which the main flow is substantially horizontal.

2. Oil naturally accumulates at the top of the separator, and to ensure that it does not remix it is essential that the oil-collecting chamber should be entirely free from the circulation of water. Thus the oil-collecting chamber must be remote from the water inlet and outlet, and must not

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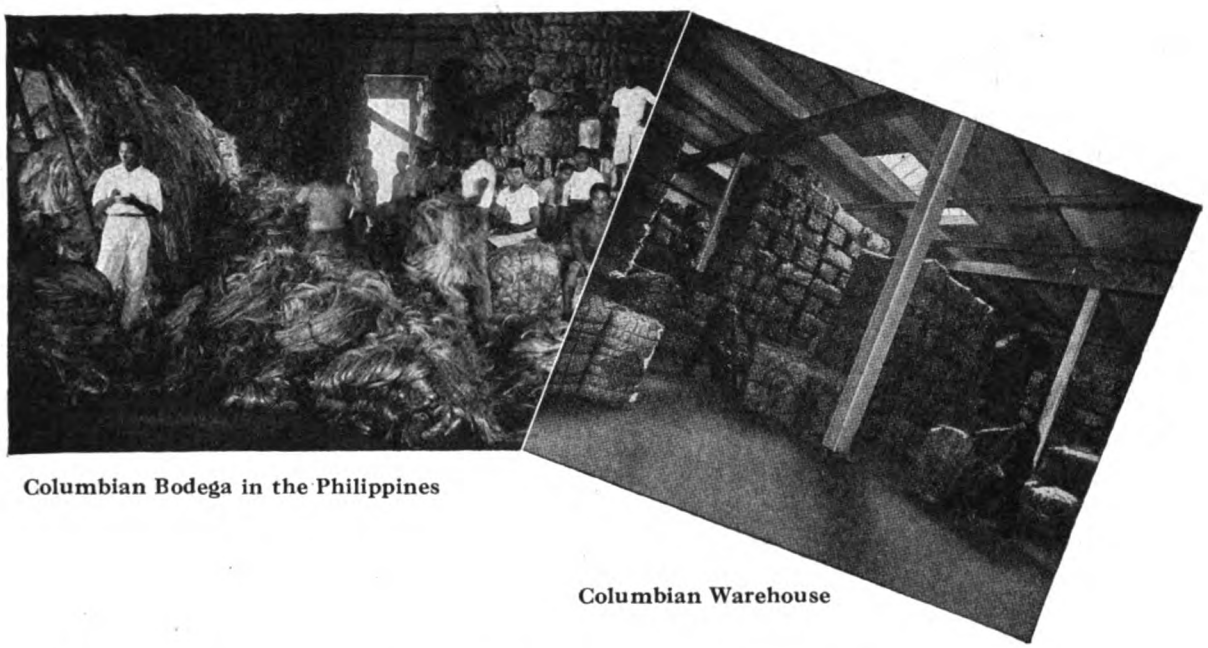

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provide a path for the flow of water from inlet to outlet.

3. The discharge of water must be continuous. The oil discharge may be continuous or intermittent; but provision must be made to prevent the discharge of water from the oil outlet, and the means provided must not be adversely affected by the motion of the ship in a seaway.

4. Oil broken into small globules (pseudo-emulsified) by passage through the pumps and pipes will not separate by gravity unless the flow is perfectly steady. An efficient separator will therefore have due provision for the prevention of eddying.

The application of these principles will now be studied in more detail by reference to the various types of separator which have been evolved.

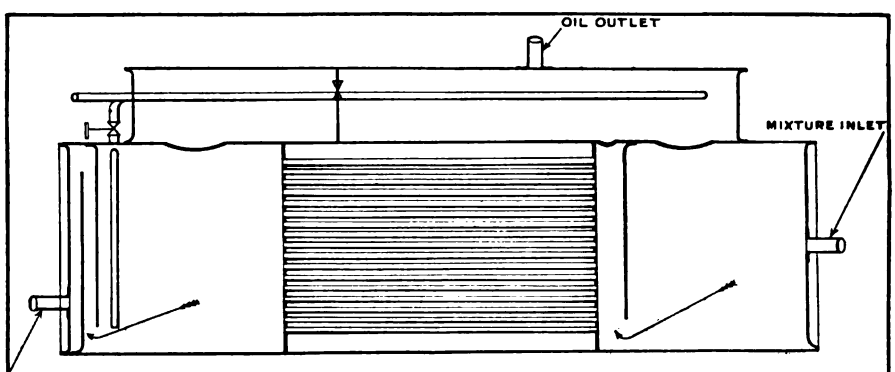


FIG. 13.—THE "STREAM-LINE" SEPARATOR. H. S. HELE-SHAW AND A. BEALE'S PATENT OF 1925.

In the class in which a substantially horizontal flow has been adopted, an early invention of I. S. McDougall (designed for removing oil from boiler feed-water, and dated 1892) gave an extremely good lead to other designers. The oil-collecting chamber was suitably remote and distinct from the main flow, and the whole system was a closed one, and therefore suitable for installation at any level in a ship. The oil was discharged by the intermittent operation of a hand valve, in conjunction with observation cocks at suitable levels as shown in Fig. 1.

In 1903 J. Niclausse patented the arrangement shown in Fig. 2, which in general principle is seen to be analogous to that of McDougall, differing in points of detail. In particular the greater accessibility of the oil-collecting portions to the main flow—making it certain that a proportion of water will sweep through the oil-collecting space, possibly carrying some oil into the water discharge—must be regarded as a retrogression.

W. E. Lake's patent of 1904 (primarily used for recovering lubricating oil which had become mixed with water) also embodied the same principles, except that the baffle plates were dispensed with. The oil-collecting chamber itself was suitably free from water current, but there was a probability of a proportion of the water sweeping around the area, A, indicated on Fig. 3, in the preliminary settling chamber and carrying oil away.

More recently (1923) F. Pink has developed the apparatus now called the "Pirbright" separator, illustrated in Fig. 4, in which the features already described have been combined with means for automatically withdrawing the recovered oil. By means of a float, designed to sink in oil but float in water, the oil discharge valve is opened when oil has accumulated and closed before any water can be discharged. Owing to the small margin of difference between the densities of oil and water, and the adhesive nature of the oil in which the valve operates, the float is made of considerable size, and operates the valve not directly (as shown in the diagram) but through a steam or other relay.

The plants shown in Figs. 5 and 6, inventions of Mr. J. H. Palmer and Sir James McKechnie respectively, also come in the same broad class as those previously mentioned. In Palmer's apparatus the main flow is horizontal, but the constraining of the main flow to rise near the oil-collecting space at A seems liable to cause oil to be entrained in the water discharge.

McKechnie's apparatus is generally similar, but arranged in the form of a spiral, so that the water takes a tortuous path and passes a multiplicity of baffles before being finally discharged. The length of path traversed is a good feature, although, of course, time is the main requirement for separation, and in a plant of given size for a given throughput the arrangement of a tortuous path increases the velocity of flow in the same proportion as the distance traveled, so that the time factor is unchanged.

In addition to the separators in which the flow is substantially horizontal, there are a considerable number in which this is sacrificed in order to introduce some other feature held to be desirable.

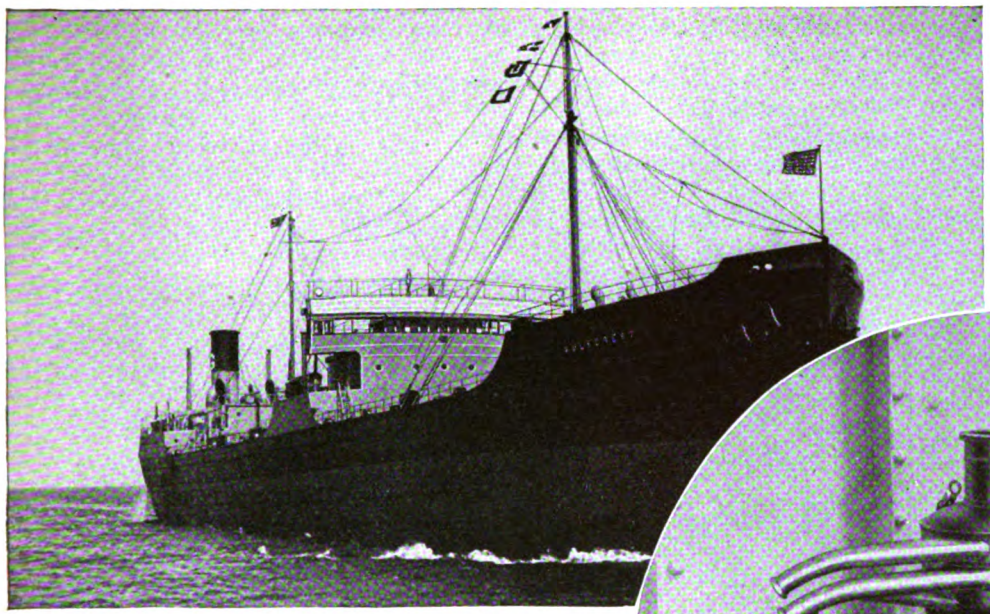
The "Conduit" separator Fig. 7, is typical of the principle of most of these. It consists of a very large U-tube with unequal legs, the oily mixture being introduced at the top of the larger leg, in which the oil accumulates and from which it is withdrawn. The water passes down the larger leg and up the smaller, where it is discharged into an observation tank, and thence overboard. The water and oil are discharged continuously at suitable levels, the difference between which depends on the density of the oil to be dealt with, and needs to be adjusted to suit. This weir discharge provides some justification for the vertical flow, which is otherwise inferior in efficiency to a horizontal arrangement. Obviously the greater the vertical length of the columns the greater the margin which can be allowed between the weir levels; hence the great height of the apparatus, which is otherwise purposeless. Apart from the adjusting of the levels to suit varying grades of oil, the discharge is automatic, although the advantage appears to be offset by the unsuitability of an open-topped system for use in a seaway.

The "Rocket" and "White-Comyn" separators, Figs. 8 and 9, follow the general principle of the "Conduit." A more compact apparatus is produced by rearranging and duplicating the essential U-tube passages; but this introduces the disadvantage of a smaller margin between the weir levels, and the more delicate adjustments necessary are still more unsuitable for use in a seaway.

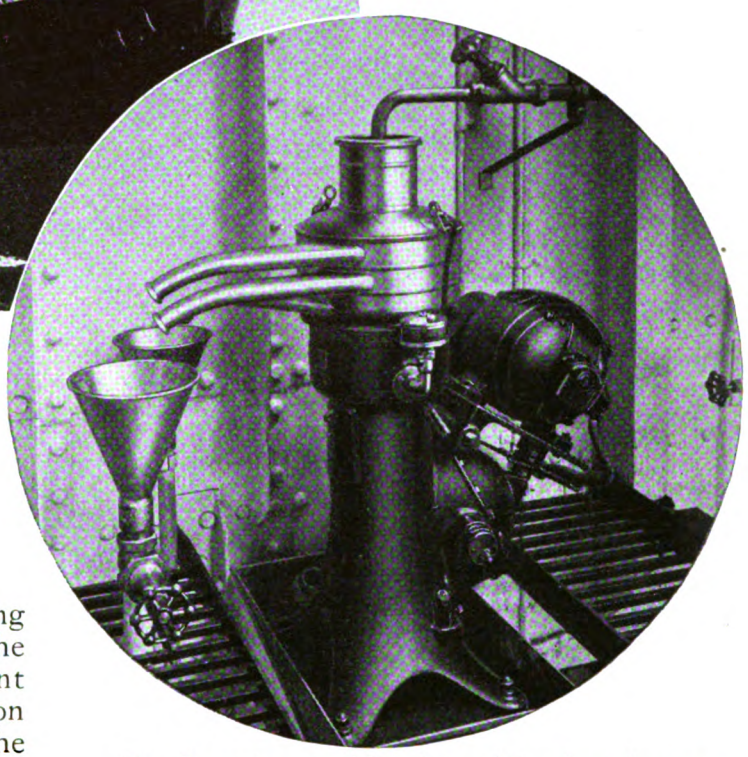
The "Fisher" separator, Fig. 10, is also similar to the "Conduit," but with the provision of a spiral surface in the separation chamber up the underside of which the oil is supposed to creep into the oil-delivery space, with less chance of being carried forward by the water flow.

The four separators last described use a vertical flow in order to introduce the weir discharge. For ship use, therefore, they must be carried above the water-line, since otherwise the discharged water must be repumped in order to pass it overboard.

Two further vertical-flow arrangements may be mentioned, in which the weir discharge method is not used and the system is closed.



At the left is shown the M. S. Gulfcrest of the Gulf Refining Company. Below: The De Laval Oil Purifier which furnishes clean oil to her two 1600-b.hp. A.B.B.-Werkspoor engines.



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The M. S. Gulfcrest of the Gulf Refining Company bears the distinction of being the first large vessel launched at the former plant of the New York Shipbuilding Corporation since that company was absorbed by the American Brown Boveri Electric Corporation.

Like most modern Diesel-engined vessels, she is equipped with a De Laval Oil Purifier in order that her two 1600-b.hp. A.B.B.-Werkspoor engines may have the protection of clean lubricating oil. This machine constantly maintains the efficiency of the oil by removing water and other impurities from it as fast as they enter the system. At the same time it makes it possible to keep the same oil in service indefinitely.

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Fig. 11, illustrates the plant covered by the patent of C. S. Lenz and G. E. Jupp, in which the water flows downward through a succession of annular channels into bulky spaces where the oil disengages itself and returns upward through collecting chambers suitably spread. The removal of the oil may, however, be considerably impeded by the flow of water in these oil-collecting spaces.

Fig. 12, shows the "H. and H." dehydrator, in which the collecting plates analogous with those in Lenz and Jupp's apparatus are caused to rotate by the impinging jet of the mixture supply. This gives a slight accentuation of gravity, tending to throw the water to the outer annular clearance spaces, the value of which as a separating agent has to be offset against the mixing effect of the distributor. In this apparatus a float automatically controls the oil discharge, as in the "Pirbright" separator, already described.

The latest form of separator (in point of date) is that produced by the Stream-Line Filter Co. Fig. 13. This is of the horizontal flow type, with a closed system and a quiet oil-collecting chamber from which oil is withdrawn from time to time on observation of the inspection cocks. After passing through a preliminary chamber, in which the bulk of the oil is separated, the main flow traverses a large number of small tubes in parallel, of such proportions that steady flow is induced. In these tubes the small gloubles of oil are enabled to separate. In one type they pass through holes in the tops of the tubes, and, from the quiescent water around, into the oil-collecting chamber; in another type they are allowed to collect in the tubes until they coagulate and are carried forward by the water to a trap where—being now in a readily separable form—they easily emerge from the water flow and pass into the oil-collecting chamber.

Eddy Motion In Oil Separators

In this discussion of particular separator designs nothing has so far been said of the means for avoiding eddying motion, although it has already been mentioned that in an eddying flow the smaller oil globules can never be separated by gravitational means.

Referring now to Figs. 1 to 13, it would appear that in many separators the baffling arrangements are on the whole liable to promote rather than reduce eddying, although even this is of secondary importance when it is realized that for plants of the size and capacity used in practice even the flow through a smooth circular pipe (the best possible arrangement for steady flow) would be of an eddying nature. The criterion for steady streamline flow in a circular pipe is well known, being that $\frac{v\,d}{\mu/\rho}$* (Reynolds's function) must not exceed a critical value, which is, in point of fact, about 2000. Substituting the value of μ/ρ for water at normal temperature gives $v\,d$ = 1/40 ft.²/sec.

*v = velocity, d = *diameter*, μ = viscosity, ρ = density.

Now the volumetric flow Q through a pipe of diameter d is $\frac{\pi d^2}{4} \times V$, and substituting from above this gives Q = $\frac{\pi d}{4} \times \frac{1}{40}$ ft.³/sec.—i.e. $\frac{\pi d}{160}$ ft.³/sec., if d is in feet.

Thus the permissible throughput if eddying is to be avoided increases directly as the diameter (and *not* as the square of the diameter, as might have been anticipated), and if a throughput of 200 tons per hour is required, d must be given by

$$\frac{200 \text{ tons}}{\text{hour}} \times \frac{35 \text{ ft.}^3}{\text{ton}} \times \frac{\text{hour}}{3600 \text{ sec.}} = \frac{\pi d}{160} \text{ ft.}^3\text{/sec.}$$

$$\therefore d = \frac{200 \times 35 \times 160}{3600\,\pi} = 100 \text{ ft., about}$$

If eddying is to be avoided in a single circular pipe a throughput of 200 tons per hour necessitates a diameter of 100 feet and for any other form of cross-section the dimensions would need to be still further increased.

It is obvious, therefore, that in any separator not providing for a highly divided flow, eddying must occur with reasonably large throughputs unless the dimensions are made unreasonably large. Further, since it is much easier to keep below the critical value of $v\,d$ when d is small, small-scale models of any reasonable form of separator give satisfactory results, so that subsequent failure on a large scale is at first a matter for surprise.

It was in order to overcome the difficulties associated with eddying motion that the writers proposed the type of apparatus (now manufactured by the Stream-Line Filter Co. Ltd.,) shown in Fig. 13, in which the large number of small tubes ensures that the flow in each is of a steady streamline character.

Reference must now be made to the various processes which have been proposed with the object of removing the last traces of oil from the water before discharge.

All known forms depend for their action on the adhesive nature of the oil, the filtering material being such as offers little resistance to the flow of water, but retains the oil either on its surface or in its pores.

There is a certain amount of secrecy as to materials actually employed, but it is well known that some makers have used felts of cow-hair or wool, while others have tried wool flock, cotton-wool etc. These may be classified as of organic origin; while, on the other hand, an inorganic material is used by the Stream-Line Filter Co.

In developing a suitable filter two main difficulties have to be met:

1. The large quantities of oily water to be dealt with.

2. The necessity for renewing the filtering material economically.

With regard to 1, an efficient preliminary separator will limit the quantity of oil to be dealt with by the filter to less than one part in ten thousand of water, though even this means twenty gallons of oil per thousand tons of water. It is, therefore, clearly very desirable to eliminate as much oil as possible in the separator, either by making it very large or by the means suggested by the writers.

With regard to 2, the replacement of filtering material is costly, so that means for cleaning are practically essential. Organic fibers can be cleaned by a dry-cleaning process, although this involves removal from the filter and is not an operation which would commend itself to shipowners. Inorganic material is readily cleaned by blowing back with steam; the increase of temperature reduces the adhesiveness of the oil and it is therefore removed by the current of steam. This method is inapplicable to organic materials because of the resulting shrinkage and structural changes.

Summary of Present Position

As stated already, it is possible to reduce the oil content in the final water discharge to not more than one part in two hundred thousand of water with a plant of reasonable size, which fulfills the conditions of being easy to operate, self-contained, and obviating expensive renewals. With such a plant the prime cost can be written off in a few months by the value of the oil recovered, and the

(*Continued on Page* 56)

Roscoe Seybold Promoted

Roscoe Seybold, formerly manager of price statistics of the Westinghouse Electric & Mfg. Co., has been appointed assistant to F. A. Merrick, vice president and general manager of the company.

Mr. Seybold has been with the Westinghouse company since 1907. He

ROSCOE SEYBOLD

was born in Rockville, Ind., and attended Purdue university. After graduating from that school in 1907, with the degree of bachelor of science in electrical engineering, he immediately came to East Pittsburgh where he entered the college graduate apprentice course. At its completion he was placed in the price department and later was transferred to the sales department, where he was located for some years prior to this present appointment.

Order Oil Barge

Bethlehem Shipbuilding Corp. has been awarded a contract for a 10,000 barrel oil barge to be built at the corporation's Harlan plant, Wilmington, Del., for the Seaboard Shipping Corp. This barge is intended for service in New York harbor. Delivery is to be made Jan. 1, 1927.

Rossbottom Retires as Head of U. S. Lines

Thomas H. Rossbottom, manager of the United States lines of the United States shipping board, has retired from this position and will return to the war department.

Mr. Rossbottom was loaned to the shipping board by the war department shortly after the shipping board commenced operation of the transatlantic fleet, including the Leviathan. He had made a fine record as head of the Panama Railroad Steamship Co. which is a corporation owned by the United States government and operated by the war department. General Dalton, president of the Fleet corporation intimated that the war department has asked for Mr. Rossbottom's return by September 1. In the meantime David Burke, his assistant will fill the position of manager temporarily.

Every fair minded person will concede that the retiring manager made a splendid record in operating the LEVIATHAN and the other transatlantic liners for the government. He has through careful management steadily reduced deficits to a point where it has been predicted that this line would soon be a paying proposition.

The resignation of Elmer C. Crowley and the appointment of General Dalton as head of the Emergency Fleet Corp. was an indication to many that the shipping board intended to carry out the administration's plan of selling the government ships as rapidly as possible.

At a recent meeting of the stockholders of the Sperry Gyroscope Co., Elmer A. Sperry, founder of the company, was elected chairman of the board of director, and Charles S. Doran, president and manager.

Can Run 30 Days Without Re-fueling

THE tugboat JOHN T. HUGHES shown in the accompanying illustration was built at the yard of M. M. Davis & Son at Solomons Island, Md., for its owner, John T. Hughes, 15 Moore street, New York City. This tugboat is powered with a 240-horsepower Fairbanks-Morse C-O engine turning a three-bladed propeller 6 feet in diameter by a 3 feet 8 inches in pitch at 250 revolutions per minute. It is also equipped with a 10-horsepower Fairbanks-Morse type Y diesel engine which operates the auxiliaries and a 4-inch centrifugal pump with connections through the side of the house with the necessary suction hose aboard for pumping other boats.

General characteristics of the boat are as follows: Length 80 feet; beam 20 feet; draft when fully loaded between 7 feet and 8 feet 6 inches. The hull and frames are of white oak and the house is of white pine. It has an operating radius of 30 consecutive days time, as it is equipped with the necessary tanks to carry approximately 10,000 gallons of fuel oil and 600 gallons of lubricating oil. There are accommodations for seven men, all on deck.

Since having been completed and placed in operation in July, 1925, the JOHN T. HUGHES has been constantly employed with a double crew aboard, consisting of seven men. At present it is employed in towing barges between Philadelphia and Norfolk, Va., via the Chesapeake and Delaware canal and Chesapeake bay. The tug in general is built equal in strength to a 125-foot tug and was designed by the owner for inland and coastwise work. Mr. Hughes has been engaged in the transportation and shipbuilding business for the past 17 years. This oil engined boat is the third of its kind built by him for his trade.

DIESEL TUGBOAT JOHN T. HUGHES BUILT BY M. M. DAVIS & SON, SOLOMON'S ISLAND, MD.

Philadelphia Piers

(*Continued from Page* 28)

Co. took over the affairs of the New York Shipbuilding Corp. on the Delaware river, and announced that the buildings of ships will be continued on a larger scale. The Philadelphia Electric Co. acquired a site on the Delaware river at Erie avenue for the extension of its present facilities, while the William Cramp and Sons Ship and Engine Building Co. is constructing the MALOLO, the largest and fastest highpowered passenger steamship ever built in the United States, and is also engaged in constructing two coastwise vessels and a 10,000-ton cruiser for the navy. The Pennsylvania Sugar Co. will build a seven-story building at Shackamaxon and Penn streets, on the Delaware river, for the manufacture of by-products. The Ford interests purchased the Merchant Shipbuilding Co.'s plant on the Delaware and will convert it into an assembling plant. A large pier will be an improvement placed on this property. Among a number of other projects under way on the Delaware river are several announced by the Reading Railway Co.

One is the extension and widening of pier No. 14, Port Richmond, which has been and will continue to be used in the rapid handling of the increasing number of ore shipments. Another is the reconstruction of pier No. 25, North wharves, at Willow street one of the company's freight stations. A third improvement by the Reading company is a grain elevator now under construction at Port Richmond with a capacity for 2,500,000 bushels. The Reading company placed a new coal tipple in operation last year.

The growth of the fruit and vegetable industry in Philadelphia in recent years has been rapid and it is expected it will largely center on the Delaware river. In 1925 over 42,000 cars of fruit and vegetables were unloaded at the local yards, and it has been announced that the Pennsylvania railroad will construct a new produce terminal in South Philadelphia that will be one of the largest in the country devoted exclusively to this line. A forty-one acre tract in the southern part of the city adjacent to the shipping terminals will be the site used for this project, which will include several shed buildings measuring 100 by 650 feet.

The city's part in the development of port facilities has been carried out by the department of wharves, docks and ferries, which recently completed another of the Moyamensing group of piers at the foot of Porter street, No. 84, South wharves. This pier cost $3,662,424. It is 900 feet long; 336 feet wide, and has a total storage area for cargo on both decks of 465,000 square feet, or a capacity for 124,215 tons. The new pier was at once placed in active service when finished, the Luckenbach Steamship line moving its West Coast schedule of freight steamers from pier No. 78, at McKean street, a municipal pier leased by this company.

The department has under construction a municipal car storage yard appurtenant to the Porter street pier, between Delaware avenue and River street. It will cost $200,000. When completed it will have a storage capacity for 300 freight cars, and the yard will serve the four city piers forming the Moyamensing group, as well as the immense government piers which are adjacent at Oregon avenue and are operated by the Philadelphia Tidewater Terminal Co. Of the Moyamensing group the piers at McKean street, No. 78 and at Porter street, No. 84 are in active use, while the department has been authorized by city council to proceed with the construction of the piers at Jackson street, No. 80 and at Wolf street, No. 84.

The department's plans in the construction of these great terminals, chiefly in South Philadelphia, always provide for an adequate street approach to the pier entrances. The extension and the widening of Delaware avenue by the municipality has given easier and safer access to the piers and increased their value and accessibility with respect to teaming and trucking the vast quantities of shipments to and from the piers. The recent installation of a passenger bus line along the river front has afforded much-needed transportation conveniences to the thousands of workers. Delaware avenue, one of the best marginal streets of any port, is from 150 to 250 feet in width. The city of Philadelphia is thoroughly aware of the importance of water transportation in its future growth and it is the unalterable purpose of its citizens to provide the most modern terminal facilities for serving shipping expeditiously and economically.

Six

Westinghouse Diesel-Electric Boats *for the* Pennsylvania Railroad

THE Pennsylvania Railroad purchased its first Westinghouse equipped Diesel-electric tug boat in 1923. Since then, five other tug and drill boats have been equipped by Westinghouse for this railroad—the largest fleet of Diesel-electric tow boats in service.

In towing and harbor service the many advantages of Diesel-electric propulsion are particularly apparent. The flexibility and ease of control not only make possible greater efficiency and utility, but greater safety in crowded ports. A relatively high percentage of engine output that is converted into tow-rope pull, the speedier handling and maneuvering to tows, and low operating and maintenance costs are the outstanding operating characteristics of Diesel-electric tugs.

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800 H. P. Diesel Engine

(*Continued from Page* 31)

der reciprocating type. Oil is drawn from the filter tank and forced through the main lubricating oil header by one cylinder while the other cylinder is connected to the crank case sump and delivers through the cooler to the filter tank.

An air starter of the standard Winton type operating on 400 pounds per square inch is used to start the engine.

A forced oiling system is fitted. Oil is delivered by pump from the oil supply tank to a header in the case. From this header oil is distributed to the main bearings and through passages drilled in the crank shaft to the connecting rod bearings, up each connecting rod through a tube to the wrist pin sleeves and then through the wrist pin bearings in the pistons. From the wrist pin bearings the oil drains through the crank case sump.

The mufflers are of Winton design and are fitted for both exhaust and intake. Each engine has a built in thrust bearing of single collar Kingsbury type. The shaft is nine inches in diameter of 30 to 40 per cent carbon open-hearth steel subjected to rigid inspection. This bearing is particularly ample to efficiently absorb without undue heat and attention, all the thrust exerted by the propeller wheel. Equipment furnished with each engine consists of air bottles, gages, revolution counter, fuel oil service pump and a set of tools. The weight of the engine complete is 110,000 pounds. This engine will furnish power for fairly large vessels.

Rotorship Shows Economy on Trials

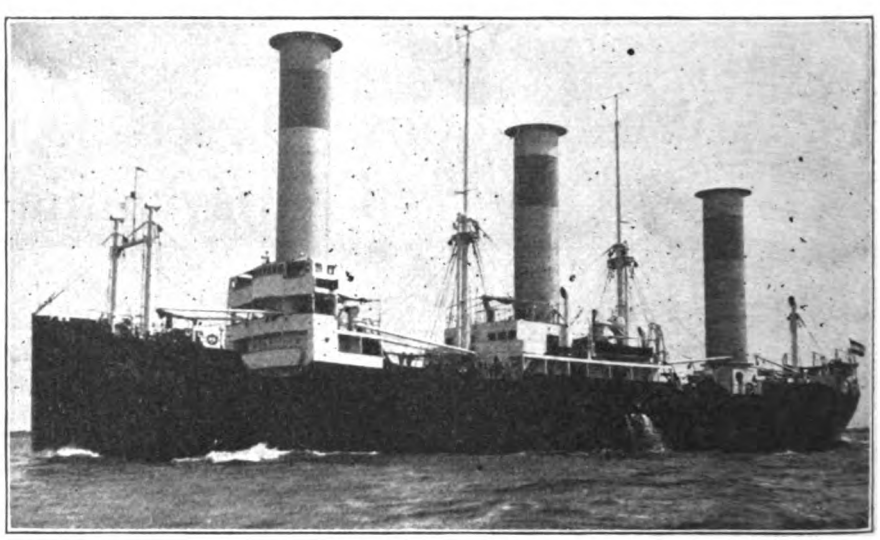
THE rotorship BARBARA recently completed at Bremen, Germany, from plans and specifications by Anton Flettner, has had a successful trial trip. As a result of the outcome of the trial the BARBARA was officially taken over and placed in the service of the Sloman line, Hamburg, who has chartered her. The first voyage with general cargo will be to Spain and Italy, after which she will be placed in the regular Hamburg-South American service of the company. It will therefore be possible at a later date to publish figures based on actual operation. The accompanying photograph shows the rotorship BARBARA on her first trial trip. The appearance is not particularly odd and reports from shipping men present at the trial indicate that the vessel looks perfectly natural.

Some of the results of the trial trip are given as follows: At wind-strength No. 4 (Beaufort scale), equal to 14 knots, the ship made a speed of 9 1/2 knots when driven by the engines alone. With one engine only, in combination with the three rotors, the same speed was developed. In other words the addition of the rotors resulted in a fuel saving of 50 per cent, neglecting the comparatively small amount of power required to revolve the rotors. Therefore in this light breeze the wind contributed an amount of power equivalent to about 500 engine horsepower. With a wind-strength of No. 6 to 7, it was possible to maintain the same speed of 9 1/2 knots without the use of the propeller. This means that 1000 engine horsepower were replaced by wind power. The maximum speed obtained by rotor power alone and without the use of the propeller was 9 1/2 knots. With a wind-strength of No. 7 the ship will travel at about 10 knots, while with an increase of the wind-strength between No. 7 and 8 the speed will be about 10 to 11 knots.

During the trials the rotors ran without noise or vibration. When developing 1000 horsepower the rotors revolved at 80 revolutions per minute. These figures are the same or slightly more favorable than those predicted by Mr. Flettner during his visits to this country. Many representatives of shipping, shipbuilding and the navy, witnessed the trial. A special trip was made for Captain Klemann, United States naval attache, Berlin. The BARBARA is equipped with a Flettner rudder, which, according to reports of the trial, functioned perfectly.

The rotorship BARBARA is a steel vessel of 3000 tons deadweight, 295 feet in length, 48.3 feet in beam and 19 feet deep. She is a cargo carrier with accommodations for a small number of passengers. The Sloman line, Hamburg, are to use her in the South American trade. There is a single propeller coupled by Vulcan-Foettinger hydraulic transmission to two diesel engines of 530 horsepower each. Either one or both engines may be used at will. The two together give the ship a speed of 9½ miles without rotors.

There are three rotors each 13 feet 2 inches in diameter and 56 feet high. A new aluminum alloy called Lautal metal has been used for making the rotor shells. Central pivots carry the ball bearings which are 31½ inches in inside diameter. In a fair breeze the rotors develop 1000 horsepower, or the same power as the diesel engines. With favorable wind the rotors alone will give to the ship the same or even a higher speed than that given by the engines. A great number of variations of power is possible when using either one or both engines in conjunction with the rotor, resulting in an economy in fuel consumption of wide range. The speed and direction of rotation of each rotor is electrically controlled from the bridge. It will be interesting to watch the operation of the BARBARA in service.



ROTORSHIP BARBARA ON HER FIRST TRIAL TRIP, JULY, 1926

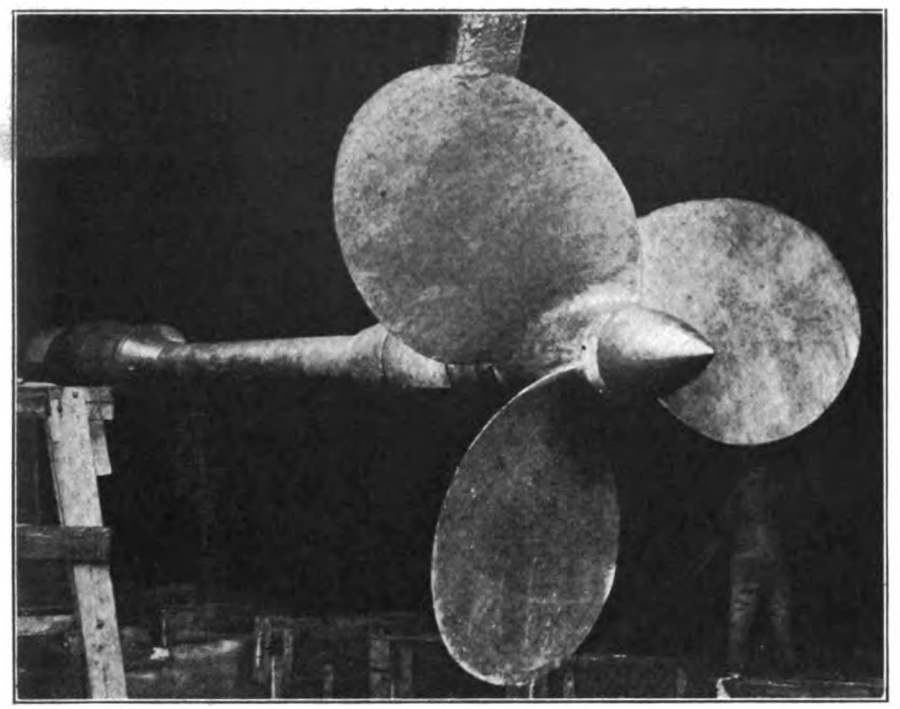
Propellers Prove Durable

(*Continued from Page* 23)

United States, and one visit to Chile by way of the Straits of Magellan. At none of the periodical inspections have any traces of corrosion or other failure of the monel metal propellers been found. Although the vessel has made frequent full speed runs aggregating over 3500 nautical miles at 20 to 22 knots, there was discovered no trace of surface imperfection from erosion, according to the reports received of the inspection of these propellers when the vessel was in dry dock. It seems that none of the conditions of the service of this vessel, in tropical sea water, ice, or brackish rivers, has made any attack upon the face of the monel metal blades, and the rate of corrosion on the customary plates provided for protection against galvanic effect is about one-half of that ordinarily experienced. In fact one of the accompanying views quite clearly shows the original tool marks on the face of one of the blades.

Although this vessel has not been very active as compared to the mileage made by the transatlantic liners or some of our own modern cruisers of the navy, the conditions met by the unprotected propellers while the ship was at anchor are more serious from the standpoint of a corrosion test than if the vessel had been engaged in more steaming at moderate speeds.

One of the accompanying illustrations showing in end-on view all three propellers indicates that the tips of the blades of the center wheel have been cut off, for a distance of some 6 inches from the tips. This propeller was so trimmed when the vessel was in dry dock in Boston during last winter in order to provide a greater clearance from the stern frame in the hope of eliminating a certain characteristic vibration which seemed to originate under the counter. It had been suggsted that this vibration might be caused by water thrown against the hull. It is not known, at the time of writing this, if the results were favorable.



PORT WING PROPELLER ON THE ARGENTINE BATTLESHIP RIVADAVIA IN DRY DOCK IN BOSTON—THOUGH IN SERVICE 14 YEARS THE ORIGINAL MACHINING TOOL MARKS ON THE FACE OF THE LOWER BLADE ARE STILL TO BE SEEN

Sounding Patent Basic

Remembrance of the famous telephone cases of over forty years ago is recalled in a decision recently handed down by Judge Lowell of the Federal district court of the United States sustaining the Fessenden patent No. 1,217,585 in a suit brought by the Submarine Signal Corp., Boston, against the General Radio Co.

Judge Lowell, in sustaining the contention that Professor Fessenden was the first inventor of an electrical method of depth sounding now employed in the submarine *Fathometer*, said in part, "Fessenden discovered a new method. The telephone cases are ample authority for the support of his claims which were very skillfully drawn, with the fifth claim of one of Bell's patents as a model."

The submarine *Fathometer*, which is based on Fessenden's discovery, sends sound impulses periodically to the bottom of the sea where they are reflected upward and then excite an electric sound receiver. The latter, by means of an electrical mechanism and a beam of light, indicates continuously, on a calibrated dial, the depth of water a vessel is in.

Professor Fessenden's discovery of this new method of depth sounding is linked in its history with the sinking of the TITANIC. It was this appalling disaster which led Professor Fessenden to experiment with his oscillator for the purpose of detecting the presence and proximity of icebergs by means of an echo.

Original Oscillator Tests

In 1914, Professor Fessenden made tests on the revenue cutter MIAMI while the latter was on its usual ice patrol off the Grand banks. In these tests Professor Fessenden found that the oscillator could be used not only to detect the presence and nearness of icebergs, but also, to determine the depth of water that the revenue cutter was in, by measuring the elapsed time between the sound of the oscillator and the return of the echo.

The subsequent development of Professor Fessenden's invention, the submarine *Fathometer*, has resulted in a new and efficient method of taking soundings. Various types of vessels, from submarines to ocean liners, are already equipped with the device.

The present decision is of interest in that it gives to Professor Fessenden proper credit for his successful pioneer work in determining the depth of water by electrical means.

Self-Unloading Freighter Ordered by Bradley

Ever since the self-unloading steamer T. W. ROBINSON was completed at the Lorain, O., yard of the American Shipbuilding Co., over a year ago, there has been under consideration the construction of a similar vessel. The experience with the ROBINSON indicates that the bold step taken of fitting her with turbo-elec-

tric propulsive machinery has been successful and the same type of machinery is to be used for the new steamer, contract for which was awarded to the American Shipbuilding Co. on July 29.

The new steamer will be used in the stone trade and will when completed be the longest vessel on the Great Lakes. She will be 637 feet in length overall and 615 feet length of keel, 65 feet in beam and 33 feet deep. She will have a carrying capacity of 13,000 tons on a draft of 20 feet. The main machinery will be of General Electric make and will consist of a turbo generator, delivering current to a motor directly connected to the propeller shaft. Steam will be furnished by Babcock & Wilcox marine type water-tube boilers. Coal will be used as fuel. The vessel will be built at the Lorain, O., yard and will be classed to Lloyd's specifications and survey. It is expected that the new vessel will be completed during the summer of 1927. Over 6000 tons of steel will be used in the building of this great steamer. Her usual operating route will be between Calcite and Buffington near Gary, Ind., delivering products for use at the cement plant of the Steel corporation.

The American Shipbuilding Co. now has under way at its Lorain, O., yards five large lake freighters for delivery in 1927. Many men will be needed to carry on this work. Of the four other vessels, all in the 600-foot class of bulk freighter, two were ordered by the Interlake Steamship Co., Pickands & Mather, managers, and one each by the Inland Steamship Co. and the Kinsman Transit Co.

The Toledo Shipbuilding Co. has a carferry steamer under way for the Wabash railroad. There is also some additional work being figured on.

July Lake Levels

The United States lake survey reports the monthly mean stages of the Great Lakes for the month of July, 1926, as follows:

Lakes	Feet above mean sea level
Superior	600.86
Michigan-Huron	578.53
St. Clair	573.94
Erie	571.22
Ontario	245.20

Lake Superior was 0.36 foot higher than in June and it was 0.57 foot lower than the July stage of a year ago. Lakes Michigan-Huron were 0.12 foot higher than in June and they were 0.01 foot lower than the low July stage of a year ago. Lake Erie was the same level as in June and it was 0.10 foot higher than the low July stage of a year ago. Lake Ontario was 0.11 foot lower than in June and it was 0.01 foot lower than the July stage of a year ago, 1.42 feet below the average stage of July of the last ten years.

Belnap Made President

L. J. Belnap was recently elected president of the Worthington Pump & Machinery Corp. C. Philip Coleman, retiring president, was elected chairman of the board.

Mr. Belnap was formerly president of Rolls Royce of America and chairman of Wills St. Claire Co., Detroit.

Carferries Pending

The Ann Arbor railroad is in the market for a carferry which will require 3000 tons of steel. It is to be similar to the one built last year by the Manitowoc Shipbuilding Corp. This ferry is 360 feet long with a 56-foot beam. It has two reciprocating steam engines and four scotch boilers. The Wabash railroad also is in the market for four carferries which will require about 8000 tons of steel. These will be of the same type.

Oil Separators

(*Continued from Page* 48)

plant thereafter yields a substantial profit.

Apparently events are moving in the direction of the installation of separators fulfilling these conditions on all ships having oily bilge and blast water to discharge. This paper has been prepared in order that it may be more widely realized how much has been done in respect of the provision of such separators, and that their installation is not only the means of ridding the seas of an intolerable nuisance, but also provides a real economy for the shipowners at a time when economy is most urgently needed.

Electric System Ordered

A contract has been awarded Chas. Cory & Son, Inc. for the complete installation of the electric system as well as the system of mechanical signals on the new Hudson River Day line passenger ship, now under construction by Pusey & Jones Co., Wilmington, Del.

The specifications were prepared by J. W. Millard & Bro., naval architects of New York and called for the best type of fittings and appliances. The installation includes one 15 kilowatt generator for emergency purposes. There is an 18-inch high power all brass search light and a group of auxiliary machines controlled by electric motors. The latest type of Cory aero fire detecting and alarm system will protect passenger quarters throughout the vessel.

The main switchboard controlling the generators, the various motors and the thousand of lights throughout the ship will also be furnished by the Cory Co. This switchboard will be even more elaborate than that on the ALEXANDER HAMILTON. It will be located in the engine room space adjacent to the generator but on the main deck level in full view of all passengers. The electrical installation in the engine room of this ship will follow the very best engineering practice. In addition it is being very highly finished because of the desire of the operating company to let the passengers see as much of it as possible.

Fireboat and Ferries for Seattle

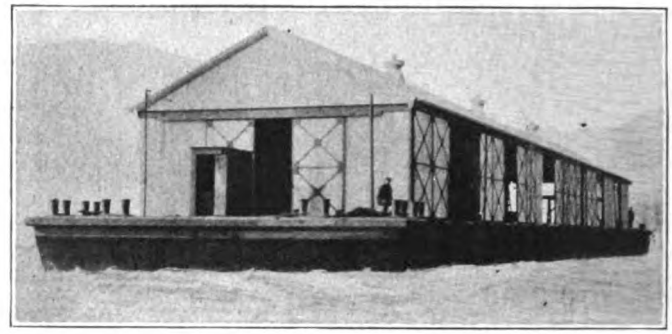
W. C. Nickum, formerly vice president and naval architect, for the Todd Dry Dock & Construction Co. has been commissioned to prepare plans and specifications for a steel fireboat for the city of Seattle. The work is well under way and it is intended to call for bids early in September. It is expected that the vessel will be built in Seattle. The plans call for completion in about 12 months. The city has appropriated $200,000 for this improvement. The work contemplated involves about 125 tons of steel plates and shapes.

Another steel job, which has not yet assumed definite form, will involve a steel auto ferry for service on Puget sound. This vessel will call for about 400 tons of steel. One of the largest operating companies on Puget sound is planning construction but preparation of plans has not yet been authorized.

Lee & Brinton, Seattle naval architects, are preparing plans and specifications for a wood diesel-powered passenger and automobile ferry for the Sound Ferry lines. This vessel will be 176 feet in length, with beam of 52.4 feet and draft of 12 feet. She will have accommodations for 500 passengers and 60 automobiles, maintaining a speed of 13 knots. A diesel engine of 900 horsepower will be installed. Electric steering gear and every modern equipment is called for. The vessel will be placed in service between Edmonds and Port Ludlow on the route between Seattle and the Olympic peninsula. Bids will be invited in September.

Floating Steel Wharf Used on the Mississippi

SHEET steel is invading the field of the picturesque wooden barges that ply our inland waterways. A barge of all metal superstructure has appeared on the Mississippi river in Louisiana. Practically it is a floating house with iron roof, sides, downspouts and gutters. Barge hulls have been constructed before of metal but metal superstructures are as yet uncommon. The unique barge shown in the accompanying illustration is 230 feet long by 40 feet wide and 12 feet deep. The cabin is 200 feet long by 32 feet 8 inches wide. About 20,000 pounds of iron and steel were used in the superstructure, the sheets being 24 and 26 gage of a special analysis iron of rust resisting qualities. The sheets were galvanized and may be painted for further protection. The advantages of the metal covering, offering full protection to contents, easy loading and unloading and long life are expected to more than offset the slight increase in construction cost over wooden barges.



All Steel Wharf Barge Built for Baton Rouge Transportation Co., Baton Rouge, La., by Midland Barge Co., Midland, Pa. The Superstructure is Made of Galvanized Sheet Steel

Use Oil Engine To Increase Profits

THE owner of the oyster dredge ELEANOR V. ROBBINS finds the use of a full diesel reversing oil engine a profitable investment. The engine, as installed, is direct connected to the propeller shaft and has an extension shaft on the forward end which operates the oyster dredges by means of clutches and winding gear.

Due to the flexibility of the engine which is a 3-cylinder 8½-inch bore by 12-inch stroke, 67 horsepower Standard Motor Construction Co. oil engine, the operator can vary the revolutions from as low as 75 to 300 revolutions per minute, turning a propeller wheel 44 inches in diameter and 34 inches in pitch.

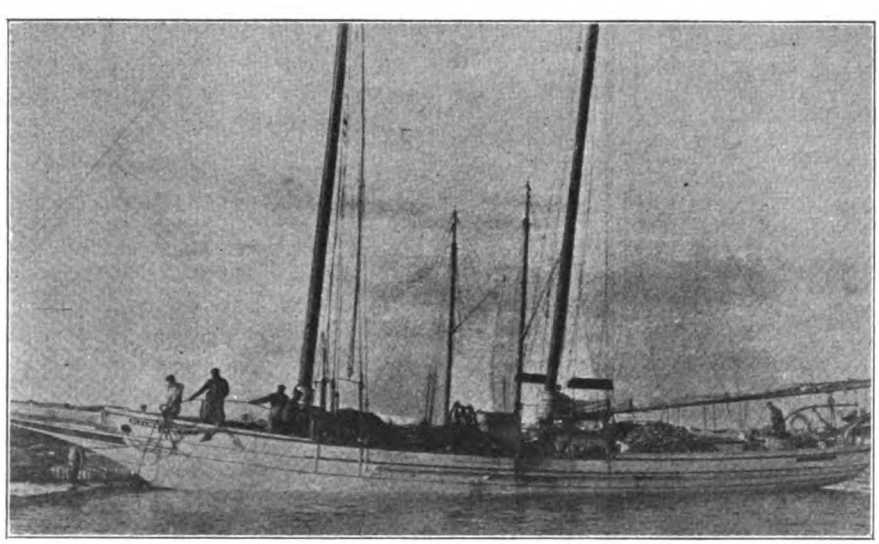
In the ELEANOR V. ROBBINS which is 74 feet long, 21 feet in beam and 5 feet 8 inches in draft, this flexibility not only permits the slow turning of the engine at a speed which is much below the necessary revolutions for working the oyster dredges when they are in operation, but there is no danger of this low speed making the power unstable due to cooling off of ignition surfaces as ignition is entirely from the heat of compression.

The engine is always ready for a large overload in quick handling, turning, and pulling in dredges.

The owner is well pleased with the installation and would not think of going back to the old expensive cumbersome reverse gear with its extra care and delays occasioned by its maintenance.

There is no class of work he cannot do better with the present equipment. In sinking stakes he is able to slow down the engine to allow the boat to hold its own against the tide which is far easier than throwing in and out a clutch or gear drive.

The low cost of operation not only makes this boat profitable in the oyster business but also permits the use of the boat for delivery of oysters long distance to market, and the boat can also be used in off seasons for the delivery of farm goods to the canneries, or for any other service, which helps to increase profits and to lower the overhead. This boat is owned by Wilbert H. Robbins, Port Norris, N. J.



A BEAUTIFUL MODELED RAKISH CRAFT—THE ELEANOR ROBBINS RECENTLY FITTED WITH A 3-CYLINDER, 67-HORSEPOWER STANDARD OIL ENGINE

Capt. Bert U. Heald and the crew of steamer BIBBCO were commended in a resolution passed by the shipping board expressing its deep appreciation for exercising courage vigilance and judgment in effecting the rescue of the master and crew of the Italian vessel ELIOPOLI and the precautions taken for the safety of the lives and property of those plying the South American trade lanes. Such acts maintain the traditions of the sea.

Hamburg American Line Takes Control

An event of great significance to American and German shipping took place early in August. Shortly following the sale of the steamships RELIANCE, RESOLUTE and CLEVELAND for $1,582,000 in cash $4,000,000 in coupon notes secured by a mortgage on the vessels and 10,000 reichsmarcks par value of Hamburg-American common stock, by the United American line to the Hamburg American line, the announcement was made that the control of the United American lines had passed to the German line, this surely indicates the rapid return to a position of prominence in shipping of the Hamburg American line.

W. G. Sickel succeeded R. H. M. Robinson as president of the United American line and W. A. Harriman retired as chairman of the board of directors. Christian J. Beck succeeded Capt. E. C. Tobey as vice president in charge of the operating department and he also continues as vice president in charge of freight traffic; A. Engelke succeeded A. W. Lishawa as treasurer; W. B. Devoe succeeded W. L. Pemberton as secretary. Emil Lederer will continue as vice president in charge of passenger traffic.

The new president has been for sometime assistant to Mr. Harriman and before the war was a director of the Hamburg American. That the company intends to regain its pre-war prestige seems evident in view of its acquisition of the three splendid trans-atlantic steamers from the American company. The total tonnage of the Hamburg American lines including these ships is now 513,000 gross tons, approximately 40 per cent of the total tonnage the line had before the war. The United American line leases piers 84 and 86 North river, New York, for a yearly rental of $570,000. This lease will now be under control of German interests, it is assumed. Insofar as the Hamburg American line is concerned the war, after all, may have done it a good turn in taking away its elaborate terminal on New Jersey shore and in giving the company control of two of the largest and newest piers on Manhattan Island.

River Company Orders Floating Equipment

The Pittsburgh Plate Glass Co. contemplates modernizing its entire floating equipment and replace its wooden fleet with steel. Addition to recent orders will be made as soon as lock and dam No. 6, Allegheny river, is completed when a modern steamboat will be built. Capt. E. K. Campbell, transportation master of the company said yesterday that an order has been placed with the engineering department of the Dravo Contracting Co. for the constuction of a sand and gravel digger of the bootjack type, which is to have a capacity of 550 tons per hour. Bids now are being asked for the construction of four steel barges, two steel dump scows and a derrick boat.

Largest Lake Freighter

Canadian Vessel Receives Warm Welcome

ON THE arrival of the new Canadian lake steamer LEMOINE which is 633 feet in length, 70 feet in beam and 29 feet deep, built at Midland, Ont., the largest freighter on the Great Lakes, at Sandusky, O., Aug. 19, a group of American steamship and railroad officials extended a formal welcome. This was the vessel's maiden voyage and her first entry at an American port and an American flag was presented to her captain. The LEMOINE was given an enthusiastic greeting as she reached the Pennsylvania docks to load coal for Fort William. Some idea of her great capacity can be realized by the fact that she carried 15,480 tons of coal on a draft of 18 feet 7 inches at each end on departure from Sandusky.

A committee representing the Lake Carriers' association made the presentation of the flag. Capt. R. W. England, chairman, W. P. Schaufele and Capt. Walter G. Stewart made up the committee. In his speech of presentation Captain England dwelt on the solid friendship which prevailed between the United States and Canada. Capt. J. H. Hudson, of Midland, Ont. master of the LEMOINE, received the colors. Chief engineer, D. A. Sinclair, of Windsor, Ont. also participated. Captain England remarks in full were as follows:

"We are here today representing the Lake Carriers association, which as you know represent about four hundred ships engaged in the Lake trade under the American flag, and we want to convey to you and your company a hearty welcome in bringing the LEMOINE to the port of Sandusky for the purpose of loading her first cargo.

"The Canada Steamship lines are to be congratulated on taking such a forward and advanced step in constructing a ship of the dimensions of the LEMOINE. Canada may justly be proud that her flag flies over her stern, and you as her master have every reason to feel honored in having command of such a ship, which at the present time is not only the largest ship on the Great Lakes, but is the largest bulk cargo ship in the world in so far as dimensions go. Our two nations have many things in common on the Great Lakes, our navigation interests are mutual, as witness these two great nations marine interests working together to preserve our lake levels. This particular ship demands the maximum draft that can be obtained if she is to be operated in an efficient manner. We also, together, are deeply interested in the improvement of our channels and harbors and all the many aids to navigation in these waters that the fleets of both our countries navigate, to the end that a safe and efficient operation of our fleets will obtain.

"The Lake Carriers association have a full appreciation of Canada's co-operation in all these matters and we believe that when your company has the foresight to construct and put in operation a ship of the dimensions of the LEMOINE that an even keener interest may be expected from Canada in all matters pertaining to marine interests.

"We trust that this ship will meet all expectations from an operating standpoint, and to you as her master we wish every success. As a slight remembrance of this event, for it is a real event in transportation history, to have the largest bulk freighter in the world come to this United States port for her first cargo, we in behalf of the Lake Carriers association present to the LEMOINE an American flag, and we trust that as this flag flies to the breeze it will always remind you of the kindly interest of our association toward Canada and your company, and our sincere hope is that these pleasant relations will always prevail."

The Kelly Barge line of Charleston, W. Va., has given a contract to E. E. Reed of South Charleston for the construction of a river terminal at Evansville, at a cost of $59,360.

Stability Determined

(*Continued from Page* 17)

the metacenter above the base, which $\frac{I}{V}$ is equal to the metacentric radius — plus the height of the center of buoyancy above the base, gave the position of the center of gravity of the vessel as 22.89 feet above the base line at inclining condition.

At 11 feet 4.5 inches mean draft, the metacenter was found to be 25.32 feet above the base line, and the center of gravity 23.61 feet, and upon subtracting one from the other it is found that the vessel had 1.71 feet metacentric height at this light ship condition. After the center of gravity of the light ship has been determined, any condition of loading may be investigated and the action of added weights, with respect to their effect on the stability of the ship may be calculated.

The displacement of the above vessel was found to be 4270 tons in light condition, at 11 feet 4.5 inches mean draft, and the vertical center of gravity was found to be 23.61 feet above the base line. Upon placing the crew on board and putting this vessel in condition ready for sea, the following calculations gave the new metacentric height:

	Tons
Displacement	4270
Passengers, cargo and stores	2160
Total displacement	6430

Taking moments about the base line to determine the location of the new center of gravity and using an estimated location of the center of gravity of the cargo stores and passengers:

$4270 \times 23.61 + 2160 \times 18.26 = 6430 \times$ C. G or C. G $= 21.81$ feet above base line.

The center of gravity in this condition was found to be 21.81 feet, above the base line which, when deducted from 23.70 feet, the height of the metacenter above the same line, by subtracting one from the other, it was found that the vessel had 1.89 feet metacentric height, and was in a stable condition to proceed to sea.

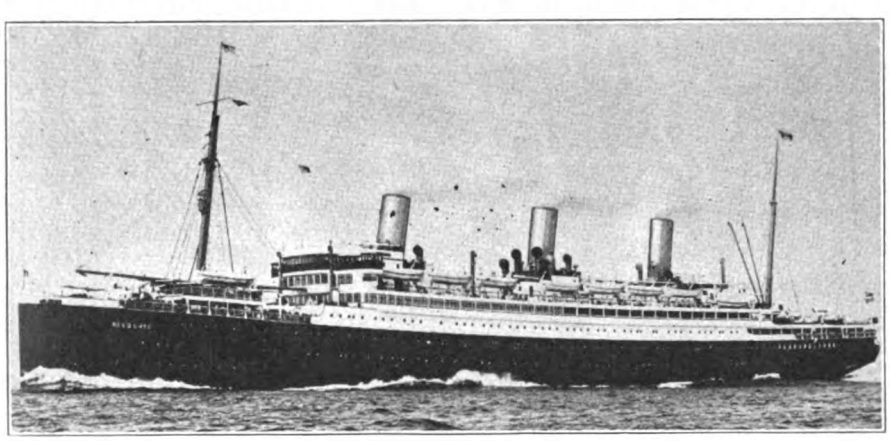
Consult Admiral Taylor

The United States shipping board on July 27, authorized Admiral Benson, in behalf of the board to call on Admiral D. W. Taylor retired, and W. F. Gibbs, in order to make practical tests of changes which have been suggested for the improvement of government owned vessels.

Chairman O'Conner stated at the time, that the board has implicit confidence in Admiral Benson's judgment and experience. The object of calling in experts was to investigate the possibilitity of alteration of hulls at a moderate expense so that after dieselization these vessels can make an average speed of 12 knots or more. The board is throughly alive to the fact now that this minimum speed is necessary at the present time for any cargo vessel, if it is to compete in ocean trade. Mr. O'Conner stressed the fact that the board is not losing sight for a moment of the ultimate objective of transferring all of the shipping property to private operators. It was further stated that prompt action will be taken by the board

German Shipping Prestige Is Growing

UNDER command of Capt. Fritz Kruse formerly staff captain of the IMPERATOR now the BERENGARIA the S. S. RESOLUTE arrived in New York on Aug. 20, with 727 passengers from Hamburg, Cherbourg and Southampton. She is the second of the three ships to arrive in this country flying the German flag since the recent sale of the CLEVELAND, RESOLUTE and RELIANCE by the Harriman shipping interests to the Hamburg-American line.



S. S. RESOLUTE RECENTLY SOLD BY THE HARRIMAN SHIPPING INTERESTS TO THE HAMBURG AMERICAN LINE

The construction of the RESOLUTE was begun before the war at the yards of the Aktien Gesellschaft Weser, Bremen, for the Hamburg-American line, under the name of the WM. O'SWALD. After the war and upon completion of the ship she was taken over by the Royal Holland Lloyd, renamed the BRABANTIA and placed in their service between Europe and South America, flying the Dutch flag. In 1922 she was purchased by the Harriman shipping interests and made her maiden voyage from Hamburg to America early in April, flying the American flag. Later her registry was changed to that of Panama. which flag she flew until the recent sale, which returned the ship to the Hamburg-American Line, her original owners—and the German flag. The RESOLUTE bears the name of the famous yacht which successfully defended the American cup against the British challengers.

She is a triple screw, 20,000-ton oil-burner, 620 feet long and 72 feet wide; she has a speed of 16.5 knots, making the voyage between New York and Hamburg in 9½ days. There are accommodations for 396 passengers in first cabin, 342 in second; and 401 in third class. She has a cargo capacity of 52,000 cubic feet, including baggage and mail room.

The RESOLUTE displays unusually beautiful lines. The passenger accommodation extend over six decks, of which three are in the superstructure above the main deck. The bridge which is ten feet wide, extends three feet over each side of the ship.

The safety appliances include all the latest approved devices; cross and longitudinal watertight bulkheads, radio, submarine signalling system, steam and water fire extinguishing systems. Antirolling tanks and bilge keels reduce rolling to a minimum even in heavy seas.

This ship, which was especially built for service in tropical waters, has earned for herself the title "queen of cruising ships." She has made three trips around the world, and on Jan. 6, 1927 will sail from New York on her fourth world cruise.

Late Flashes On Marine Disasters

Brief Summaries of Recent Maritime Casualties— A Record of Collisions, Wrecks, Fires and Losses

Name	Date	Nature	Place	Damage Resulting
A. D. Macbeth	May 31	Ashore	Hudson River	Floated
Anthony O'Boyle	May 17	Ashore	Fire Island Lgth.	Floated
Annie P. Chase	May 29	Disabled	Ocean City	Rudder-leaking
Ardgantock	May 6	Sbmged.wck.	Sandettie	Propeller
Admiral Peary	May 6	Stranded	Johnson Straits	Floated-leaking
Artemis	May 11	Struck bot.	Helsingfors	Not stated
Amazon	May 13	Ashore	Lobos Point	Floated
Amazon Maru	May 5	Aground	Antwerp Roads	Floated
Agnes	May 6	Sank	Sarnaten	Not stated
Albatross	May 5	Struck dredger	Gydnia	Propeller
Anderton	May 2	Aground	No. of Whitby	Floated
Amicus	May 4	Aground	Buenos Aires	Floated
Audny	May 4	Collision	Casablanca	Not stated
Annie Ahrens	May 7	Collision	Holtenau	Stern; rud.
Alfred Krupp	June 7	Struck pier	Duluth	Hull
Antinous	May 27	Aground	Marseilles	Floated
Atlantico	May 18	Struck rock	Off Azemmour	Ashore
Arete	May 21	Aground	W. C. of Scotland	Not stated
Anna C	May 24	Aground	Salvore Point	Floated
Appalachee	May 28	Collision	Cubitt Town	Propeller
Anna Elisabeth	May 20	Ice	Helsingfors	Damaged
Bergen	May 14	Disabled	Cape San Lucas	Not stated
Begona No. 4	May 4	Collision	Casablanca	Considerable
Blackhill	May 5	Aground	Nantes	Forepeak-leaking
Botte	May 8	Ice	Nr. Hango	Propeller
Beta	June 1	Aground	Not stated	Floated
Ben Read	May 26	Collision	Yarmouth Har.	Not stated
Brush Quey	May 26	Collision	Yarmouth Har.	Considerable
Charles Horn	May 16	Foundered	Off Point Peter	Not stated
Collier No. 1	May 21	Aground	Montreal	Floated
Chippewa	May 31	Disabled	Lake Erie	Crosshead
Coopers Point	May 21	Collision	North Wharves	Upper wks.
Coaster	May 4	Struck quay	Wisbech	Rudder
Centauro	May 2	Stranded	Pampani Rock	Sank
Catharina	May 9	Sank	Nr. Messaragotsen	Not stated
Citte De Nancy	May 6	Struck obj.	Nr. Tunis	Propeller
Chas. H. MacDowell	June 4	Aground	Mobile Bay	Leaking
Coquina	June 2	Aground	Bolivar Roads	Not stated
Chaumont	June 3	Disabled	San Francisco	Engine
City of San Francisco	May 26	Fire	Colon	Slight
Coaster	May 4	Struck quay	Wisbech	Rudder; propeller
Cedarhurst	May 17	Disabled	Constantinople	Boiler
Chiayang	May 26	Not stated	Hankow	Total loss
Dalwarnic	May 31	Collision	Off Thirty-Mile Point	Forward
Despina	May 6	Touched ground	Nr. Moselgrund	Port side
Dailwen	May 10	Aground	Buenos Aires	Floated
Dazzle	May 6	Collision	St. John's	Bowsprit
Dorothy Luckenbach	May 3	Collision	Delaware Break.	Damaged
Dewstone	May 26	Ashore	Tallinn	Floated
Dejefors	May 20	Aground	Malmo	Floated
Edward E. Loomis	May 26	Ice	Nr. Waverly Shoal	Disabled
Esther Weems	May 17	Struck obj	No. of Miami	Prop. blade
Emlynian	May 21	Disabled	Not stated	Lost prop.
Eldena	May 28	Collision	Galveston	Not stated
Emma Sauber	May 14	Ashore	Off Dragor	Floated
Essex County	May 5	Ice	Montreal	Rudder
El Grillo	May 8	Ice	Quebec	Forepeak leaking
Errington Court	May 5	Ashore	Ocean View	Floated
Euphorbia	May 7	Collision	Not stated	Bulwarks; plates
Elizabeth	June 3	Collision	East River	Deckhouse
Elma	June 6	Ashore	Cunningham Flats	Floated
Essequebo	May 26	Disabled	Demerara River	M. stm. pipe
Estrellano	May 17	Disabled	Off Land's End	Not stated
E. M. Dalgas	May 23	Aground	Baltic Sea	Floated
Ernst	May 24	Aground	Sandhamn	Not stated
Ennis	May 26	Sank	Samudas Wharf	Raised
Equatore	May 26	Disabled	Colon	Machinery
Frexcelda	May 14	Disabled	Port au Prince	Rudder
Fisher Hakon	May 10	Ashore	Reykjavik	Total wreck
Griffdu	May 28	Collision	Galveston	Bows
General Church	May 12	Fire	Stambul	Hull; cargo
Grazia III	June 2	Disabled	Norfolk	Boiler
Gabi	May 19	Aground	Warden Lodge	Floated
George Washington	May 20	Ashore	Oslo	Floated
Goldenfels	May 19	Fire	Calcutta	Slight
Harvey D. Goulder	May 31	Ashore	Nr. Lester River	Floated-plates
Harry Luckenbach	May 17	Collision	San Pedro Harbor	Port quarter aft
Harmony	May 22	Fire	Brooklyn	Slight
Howick Hall	May 13	Collision	Romer Lighthouse	Aground
Herbert L. Pratt	May 3	Aground	Neches River	Floated
Hansea	May 7	Disabled	Rotterdam	Machinery; leaking
Hosianna	May 7	Collision	No. of Dungeness	Sank
Hog Island	June 3	Collision	East River	Bow

Name	Date	Nature	Place	Damage Resulting
Hildur	May 24	Collision	At sea	Ab. water
Harelda	May 25	Collision	Ocean Dock	Strbrd. rails
Harvey H. Brown	June 11	Struck dock	Conneaut	Shoe; rud.
H. W. Smith	June 12	Disabled	Ashtabula	Rudder
Hackensack	June 3	Aground	Assateague	Ashore; leaking
Hella Daitz	May 17	Disabled	Holtenau	Crankshaft
Isonzo II	May 17	Fire	Bombay	Cargo
Imacos	May 24	Fire	Bristol	Cargo
Innerton	June 3	Ice	St. Johns	Bow
John Tracy	May 25	Disabled	Portland	Engine trouble
James B. Duke	May 6	Fire	San Francisco	Holds 1 and 5
Kalang	May 3	Collision	Malta	Not stated
Kanazawa Maru	May 18	Sank	Nr. Chemulpo	
Lake Grama	June 1	Sank	Lake Ontario	
Langton Hall	May 21	Disabled	Colombo	Rudder
Lumber Fifth	May 8	Collision	Nr. Union Bay	Damaged
Lebec	May 5	Struck bank	Columbia River	Propeller
La Marseillaise	May 10	Ashore	Salmedina	Floated
L. R. Davidson	June 4	Disabled	Lake Erie	Low pr. cyl.
Liberty	June 4	Disabled	Dunkirk	Tail shaft
Lackawanna	June 10	Collision	New York	Not stated
Melania	May 15	Collision	Shanghai	Port quarter
Mexico	May 20	Explosion	Quarantine	Engine room
Maryland	May 25	Aground	Marcus Hook	Not stated
Manchester Civilian	May 26	Ashore	Nr. Quebec	Leaking
Marie	May 11	Collision	Rhyn	Not stated
Mary	May 5	Collision	Rotterdam	Rails
Montauban	May 5	Aground	South Goodwin	Floated
Milpool	May 18	Ashore	Vit. Eman. Channel	Floated
Makura	May 21	Fire	Sydney	Slight
Maid of Samos	May 23	Disabled	River Danube	Shaft
Makaweli	June 5	Disabled	Astoria	Engine
Miramar	June 10	Hurricane	Valparaiso	Total loss
Nisbet Grammer	May 31	Collision	Off Thirty-Mile Point	Sank
Notre Dame De Fourviere	June 3	Disabled	Nr. Puerto Columbia	Propeller
Omphale	May 22	Fire	Dunkirk	Considerable
Otranto	May 11	Stranded	Cape Matapan	Floated; damaged
Oceana	May 11	Aground	Buenos Aires	Floated
Olympia	May 21	Collision	Liverpool	Not stated
O. M. Poe	June 10	Struck bot.	Calcite	Bottom
Pontiac	May 31	Collision	Near Soo	Stem; bow plates
Phoebus	May 26	Ashore	Near Gluckstadt	Floated
Pocone	May 4	Ashore	West Kapelle	Not stated
Possehl	May 10	Collision	Not stated	Upper decks
Priscilla	June 3	Disabled	City Island	Not stated
Protos	May 18	Aground	Bar Sulina	Not stated
Quedok	May 7	Aground	Soo River	Floated
R. R. Richardson	May 25	Ashore	Gull Island	Plates; floated
Reinbek	May 24	Collision	Brooklyn	Plate
Rassaplage	May 12	Fire	Not stated	Cargo
Register	May 7	Ashore	St. Ann's Bay	Floated
Reginolite	May 17	Struck quay wall	Gatun Locks	Plate; frame
Rhodesian Transport	May 17	Disabled	Rio Janeiro	Not stated
Siam City	May 29	Aground	Off Ellis Island	Floated
Salvore	May 3	Collision	Delaware Breakwater	Damaged
Silverthorn	May 4	Ashore	West Twin Island	Floated
Symria	May 23	Stranded	Kallbalan	Floated
Suarez No. 1	May 27	Aground	Terneuzen Har.	Floated
Spokane	June 9	Disabled	Sarnia	Wheel; shoe
Thomas Maytham	May 22	Ice	Buffalo	Wheel
Tongrier	May 3	Stranded	Aratuba Point	Floated
Taisei Maru	May 13	Stranded	Bungo Channel	Floated
Toulouse	May 5	Ashore	South Goodwin	Floated
Tellus	May 7	Collision	Rotterdam	Damaged
Vatergeus	May 5	Stranded	Karlskrona	Floated-leaking
Willis L. King	May 31	Collision	Near Soo	Plates
Willowbay	June 1	Ashore	Alexandria Bay	Not stated
Wytheville	May 25	Aground	Shadyside, N. J.	Floated
Wimborne	May 25	Ashore	Near Sorel	Floated
Walter Holken	May 10	Collision	Not stated	Stern; rudder
Wheatear	May 5	Stranded	Dundrum Bar	Floated
Warkworth	May 10	Ice	Montreal	Plates
Westlea	May 28	Struck iceberg	Off St. Johns	Forepeak
Walrus	June 5	Sank	Federal Wharf	
Wonganella	May 15	Disabled	E. of Cape Morton	tail shaft
Zarita	May 27	Stranded	Midmain Rocks	Considerable

Late Flashes On Marine Disasters

Brief Summaries of Recent Maritime Casualties— A Record of Collisions, Wrecks, Fires and Losses

Name	Date	Nature	Place	Damage Resulting
Alegrete	June 14	Collision	Pernambucco	Nos. 1 and 2 holds
Alderamin	June 17	Ashore	Hamburg	Leaking;—floated
Asmund	June 1	Explosion	Neufahrwasser	Not stated
Amstelstroom	May 28	Collision	Off Start Point	Not stated
Artza Mendi	June 5	Collision	Off Spurn Head	Forecastle Head
Aquitania	June 15	Aground	Gibraltar Rock	Floated
Amor	July 3	Collision	New York	Port side
Arlington	July 8	Disabled	Boston	Steering gear
Adolph Von Baeyer	June 23	Fire	Shanghai	Considerable
Arktis	June 24	Aground	Honfleur	Floated
Ancud	June 30	Fire	Valparaiso	Sank
Baldhill	June 21	Collision	Schuylkill	Bows
Blythmoor	June 23	Struck pier	Dover	Bows; plates
Ben Henshaw	June 1	Collision	Great Yarmouth	Not stated
Begona II	June 10	Struck wharf	Port Talbot	Not stated
Basso Piave	June 11	Struck fender	Brunsbuttelkoog	Propeller
Borda	June 14	Fire	Las Palmas	Not stated
Ballenas	July 7	Ashore	Seal Island	Not stated
Benarty	July 9	Collision	Dover	Bows
Betty Maersk	June 20	Collision	Antwerp	Not stated
Bruhi Muie	June 9	Collision	Valparaiso	Bows; deck
Central West	June 22	Ashore	Georgian Bay	Floated; plates
Canadoc	June 21	Collision	Buffalo	Plates
Cubore	June 25	Disabled	At sea	Engine
Coahoma County	June 29	Collision	Thames River	Bow plates
Calonne	May 29	Hvy weather	La Rochelle	Plates; deck
Canton	June 3	Disabled	Antwerp	Motor
Cantabria	June 9	Collision	Rotterdam	Stern
Chasseloup	June 9	Collision	Port Etienne	Sank
Cestrian	June 10	Collision	Off Southend	Damaged
Cardonia	June 14	Fire	New Orleans	Considerable
City of Naples	June 15	Ashore	Ommairaki	Considerable
Cygnus	July 5	Aground	Southeast shoal	Floated
Chemong	July 5	Collision	Soulanges canal	Forward
City of Toledo	July 7	Aground	Cedar Point	Floated
Cap St. Jacques	June 24	Fire	Haiphong	Superstructure
Cisil	June 28	Stranded	Off Saelgrund lighthouse	Floated
Delft	June 16	Ashore	Nr. Santa Clara	Not stated
Diana Dollar	June 16	Fire	Brooklyn	Not stated
Denham	June 9	Collision	Rotterdam	Not stated
Doris	June 10	Collision	Off Southend	Damaged
Don Quixote	June 10	Fire	Puerto Mazarron	Not stated
Dionyssios Stathatos	June 23	Aground	Martin Garcia	Not stated
Dumra	June 24	Aground	Tirene	Floated
D'Enambuc	June 29	Aground	River Scheldt	Floated
Else Hugo Stinnes	June 14	Collision	Pernambucco	Not stated
Ellendale	June 19	Aground	Bayou Bondouca	Not stated
Empress of Australia	June 23	Disabled	Nagasaki	Machinery
El Capitan	July 2	Disabled	New York	Rudder
East Wales	July 2	Disabled	Queenstown	Machinery
Enterprise	May 31	Collision	South Shields	Not stated
Enseigne Maurice Prechac	June 4	Aground	Nr. Maassluis	Floated
Else	June 3	Ashore	No. of Skag	Not stated
Eric Calvert	June 10	Stranded	Nr. Scholpin	Floated
Ebbrix	June 9	Stranded	Ramsgate	Floated
Elopoli	June 14	Sank	At sea	
Eumaeus	June 13	Collision	Liverpool	Stem; port side
Eastmor	July 8	Struck sub. object	Genoa	Afterpeak; leaking
Enrique Ballestros	June 24	Disabled	Gijon	Propeller
Empress of Australia	June 24	Disabled	Glasgow	Engines
Fort Bragg	June 15	Aground	Coos Bay	Floated
Falmouth	June 23	Fire	Sable Island	Total loss
Fred Cleeves	June 27	Stranded	Sheet Harbor	Floated; leaking
Fidelitas	June 17	Collision	Rotterdam	Not stated
Francis	July 8	Fire	Brooklyn	Considerable
Feodosia	June 24	Ashore	Setubal	Floated
Fendris	June 21	Collision	North Sea	Bows
Ferdinand	June 19	Collision	Hamburg	Stem
Frieda	July 7	Collision	Off Carysfort Inlet	Bows
Glenledi	June 17	Collision	Lake Superior	Damaged
Glenross	June 17	Collision	Lake Superior	Damaged
Geneva	June 12	Fire	Not stated	Total loss
Glendaruel	June 17	Disabled	Norfolk	Engine
George G. Henry	June 29	Disabled	Off Highlands	Engine
Gunborg	May 31	Collision	South Shields	Not stated
Glensanda	June 3	Collision	Not stated	Bow plates
Gizini	June 10	Struck pier	Southend	Sank
Grace	June 11	Ashore	Newton	Not stated
George H. Ingals	June 6	Aground	Nr. Port Lambton	Floated
Gretchen Muller	June 29	Aground	Wick Harbour	Floated
Hastings County	June 14	Ashore	Nr. Orkney Isls.	Floated
Horace X. Baxter	June 21	Struck dock	San Pedro	Plates
Henry Ford	July 2	Struck dock	Detroit River	Bow
Hoosac	June 30	Ashore	May Island	Forepeak; floated
Horace Luckenbach	June 29	Fire	San Francisco	Not stated
Hwatai	June 13	Collision	Liverpool	Not stated
Hamilton	July 5	Collision	Soulanges canal	Not stated
Helene Blumenfeld	June 25	Collision	Austruweel Roads	Damaged
Hellium	June 27	Collision	Hayward's Roads	Deck
H. M. Storey	June 28	Collision	Santa Barbara	Considerable
Ionian	June 5	Disabled	Aberdeen	Shaft; prop.
Isa	June 6	Touched bot.	Raume	Considerable
Jelling	June 19	Struck rocks	Bergen Point	Leaking
Joazeiro	June 7	Collision	Monte Video	Not stated
Johann Geor	June 8	Ashore	River Ythan	Not stated
Justice	June 25	Aground	Margate Hook Sands	Floated
Kansan	June 25	Ashore	Oakland Creek	Not stated
K. B. 85	June 1	Disabled	Viborg	Leaking
Koria Maru	July 8	Disabled	San Francisco	Steering gear
Llangollen	June 21	Ashore	Parrachos, Mara	Floated
Lillian Luckenbach	June 21	Collision	Schuylkill	Upper works
Lord Hartington	June 1	Collision	Great Yarmouth	Bowsprit
Leicester	June 17	Disabled	Cape Bould	Leaking
Levanter	July 8	Fire	Brooklyn	Considerable
Mary	June 19	Collided dock	San Juan	Rudder
Munargo	June 23	Ashore	English Banks	Floated
Margery Austin	June 24	Ashore	Onset	Floated
Mystery	June 27	Fire	Off Reedy Point	Sank
Manaia	June 11	Ashore	Hoe	Not stated
Meta	June 12	Struck pier	Eastham Lock	Stem; plates
Margaret A. Howard	July 3	Ashore	Harts Island	Not stated
Marseille Estaque	June 16	Sprank leak	Off Vado	Sank
Meteor	July 10	Ashore	Spar Point	Plates
Meigle	June 26	Stranded	St. Anthony	Floated
Marie Parera	June 30	Collision	Buenos Ayres	Sank
Masirah	June 27	Collision	Antwerp	Starboard side
Namaqua	June 8	Disabled	Port Elizabeth	Tail shaft, propeller
Notre DameFourviers	June 6	Disabled	Colon	Shaft
Numidia	June 8	Struck quay wall	Prince's Dock	Stem; plates
New Toronto	June 17	Aground	River Calabar	Not stated
Newport	July 7	Fire	Portland, Oreg.	Considerable
Nemrac	June 21	Ashore	Uleaborg	Not stated
Nancy	June 27	Collision	Hayward's roads	Bow
Nervier	June 27	Fire	Mozambique	Not stated
Ortega	June 23	Aground	Jupiter Lghth.	Floated
Opihi	June 15	Fire	Plymouth	Not stated
Oneida	July 8	Fire	Brooklyn	Considerable
Orari	June 19	Collision	Hamburg	Plates
Perseus	June 13	Disabled	Lake Erie	Tail shaft
Penobscot	June 30	Collision	Off Cape Charles	Port bow
Principessa Mafalda	June 3	Collision	Genoa	Not stated
Paul Schoup	June 14	Explosion	San Francisco	Considerable
Point Sur	June 17	Collided wharf	Mobile	Plates; frames
Port Kembla	July 8	Ashore	Off San Salvador	Not stated
Resource	June 13	Struck submgd. obj.		Leaking
Reiyo Maru	July 1	Struck rock	Amatignak	Not stated
Renown	June 20	Hvy. squall	Bristol Channel	Sank
Rheinland	June 25	Collision	Austruweel Roads	Damaged
Salatiga	June 22	Stranded	Flushing	Floated
Stella	Not stated	Touched bottom	Dorchester Bay	Capsized; floated
Seneca	June 27	Grounded	Miami	Floated
Sunbeam	June 1	Disabled	Aberdeen	Machinery
Shikano Maru	June 3	Collision	Not stated	Not stated
Suffolk Coast	May 28	Collision	Off Start Point	Plates
Sebou	June 9	Collision	Nr. Melilla	Sank
St. Louis	June 9	Collision	Port Etienne	Hull
Sheaf Crest	June 17	Collision	Rotterdam	Port Bow
Thomas Maytham	June 17	Struck obstr.	Milwaukee	Plates
Tynemouth	June 21	Collision	Boat Harbor	Not stated
Thos. P. Beal	June 30	Collision	Off Cape Charles	Not stated
Tusitala	June 3	Ashore	Brooklyn	Floated
Twyford	June 10	Stranded	Hinderribben	Floated
Tynemouth	June 10	Aground	Rotterdam	Floated
Taiyu Maru	July 3	Ashore	Siberia coast	Not stated
Tydeus	June 22	Disabled	Kobe	Propeller
Village Queen	July 4	Ashore	Cockawee Shoal	Floated
Walter Jennings	June 14	Ashore	Southwest Pass	Not stated
Waukegan	June 22	Collision	Off Sandy Hook	Not stated
Walrus	June 14	Sank	Federal Wharf	Raised
Waukegan	June 22	Collision	Sandy Hook	Forepeak
Willis L. King	June 2	Collision	Nr. Port Iroquois	Not stated
West Cheswald	June 5	Collision	Off Sprun Head	Bow plating
William Johnson	June 13	Stranded	Lake Two Mountains	Considerable
Willem Rene	June 25	Struck Gates	Royers Sluise	Not stated
Warwick	June 28	Collision	Santa Barbara Channel	Considerable
Young Charlie	May 31	Struck rocks	W. of Penzance	Sank

New Trade Publications

REFRACTORY CEMENT—A leaflet by the Illinois Clay Products Co., Joliet, Ill., features its high-temperature cement, prepared for use where fire clay or fire brick do not meet requirements. It is a powder to be mixed with water and sprayed or spread on the furnace surface or used as a mortar between bricks.

SCALE PREVENTION—An electrical method of preventing formation of scale in steam boilers is the subject of a booklet by the Nee-Wat Method Inc., St. Louis. By using two alternating currents in the water and the steel of the boiler, the two circuits being out of step, the scale is prevented from adhering.

OIL CUPS—A wick-feed oil cup manufactured by the Hunter Pressed Steel Co., Lansdale, Pa., is described in a leaflet by that company. Another type utilizing pressure to feed grease to bearings also is featured.

LIQUID FUEL VALVE—A bulletin by the William M. Bailey Co., 508 Bakewell building, Pittsburgh, describes its regulating valve for accurate, measured regulation of flow of fuel oil, tar, water and other liquids. Minute adjustment of orifice through a special form of needle valve and orifice gives a close degree of adjustment of liquid passing the valve.

TURBINE RECORDER—Uehling Instrument Co., Paterson, N. J., is distributing a bulletin covering its combined barometer and vacuum recorder for use with steam turbines, recording the absolute back pressure of the exhaust. High accuracy is claimed because of the mercury column principle employed. The bulletin gives turbine preformance data, charts, sectional views and dimension diagrams.

NICKEL STEEL—Illustrations of the use of nickel steel for strength under stress are presented in a bulletin by the International Nickel Co., New York. Pictures carry the message, with a minimum of text.

CENTRIFUGAL PUMPS—Multi-stage centrifugal pumps of the single suction opposed impeller type are described in a bulletin by the Pennsylvania Pump & Compressor Co., Easton, Pa. Detailed description of the pumps, with diagrams and illustrations are given.

COPPER STEEL—A booklet has been issued by the American Sheet & Tin Plate Co., summarizing the results of tests made on the relative resistance to corrosion of steel sheets containing a small portion of copper and those without. The conclusions of a number of scientists who have investigated the tests are given, with data on the tests.

SILENCERS—Most spectacularly known as a muffler for the report of firearms, which gave it most general news value, the Maxim silencer has been applied to the elimination of disturbing noise resulting from a variety of industrial operations. Some of these applications have been presented in a leaflet by the Maxim Silencer Co., 422 Asylum street, Hartford, Conn. It is an interesting contribution to the campaign for removing nerve-racking sounds.

WIRE ROPE—Much practical information about the use and care of wire rope, how to measure it, how to and not to uncoil it, making of splices, how to seize and socket it, is included in a handbook issued by the American Cable Co., New York. Drawings illustrate how to make equalizing slings, bridle slings and other equipment. In fact the book covers all phases of use and care of wire rope.

PUMPS—A bulletin has been issued by Goulds Pumps Inc., Seneca Falls, N. Y., covering several types of pumps developed recently for special purposes. It is well illustrated and the pumps cover a variety of uses.

GRATINGS AND TREADS—Grating Co. of America, Pittsburgh, has issued a bulletin giving data on safe loads for its various types of gratings and describing features of construction that make for strength.

TACHOMETERS—Recording and indicating apparatus for obtaining the rate of revolution of any kind of machinery is described in a bulletin by the Bristol Co., Waterbury, Conn. Various methods of obtaining this information are illustrated by the company's several forms of apparatus and accessories are shown.

Business News for the Marine Trade

Lake Giltedge Steamship Co. Inc. has been incorporated at Mobile, Ala., with $50,000 capital by S. A. LeBlanc, 1951 Government street. J. M. Walsh, 7 St. Michael street, is president. It will operate a line between Mobile and Florida.

Consolidated Navigation Co. has been incorporated at Baltimore, Md., with headquarters in the Citizens National Bank building, to operate a steamship line between Baltimore and Palm Beach, Fla.

North and South Floating Inn Co. has been incorporated at Miami, Fla., by G. Lincoln Dillaway, president, 84 State street, Boston, to operate steamers anchored off the coast of Florida for floating hotels.

Clark Steamship Lines has been incorporated at Tampa, Fla., by J. R. Clark, president, to operate a line betweeen Miami and Tampa.

East Coast Barge Line has been incorporated at Jacksonville, Fla., to operate a freight line between Jacksonville and Miami. It has $500,000 capital and is headed by Fred B. Doty and Gus Jordao of West Palm Beach.

Gallow-Keenan Stevedoring Co. has been incorporated at New York with $6000 capital by A. Gallow, P. Keenan and E. Devlin. W. F. Smith, 291 Broadway, is attorney.

J. E. Bernard & Co. have been incorporated in New York to act as shipping agents, with $100,000 capital, by M. Powell, E. D. Harward and L. T. McManus McKercher & Link, 40 Rector street, are attorneys

Marine Auto Corp. has been incorporated at New York to manufacture auto boats with $100,000 capital by H. A. Funke, K. Leps and O. A. Foster. E. P. Foster, 141 Broadway, is attorney.

Munson Inland Water Lines has been incorporated at New York with $100,000 capital by M. Munson and M. Dimm. Rumsey & Morgan, 20 Exchange place, New York, are attorneys.

Empire Lighterage Co. has been incorporated at New York with $10,000 capital by C. G. Bleakley, A. P. Coons and F. L. Hills. Gilroy & Hyman, Woolworth building, are attorneys.

Matton Towing Corp. has been incorporated at Cohoes, N. Y., with 500 shares no par value by J. E. Matton, R. E. Matton and E. M. Matton. H. S. Kahn, Albany, is attorney. The steam tugs H. E. Wise and R. E. Matton have been incorporated by the same interests.

Spokane Steamship Co. has been incorporated at Port Huron, Mich., with $150,000 capital to do lake freighting by Thomas J. Reid, and James T. Reid, 1906 Military street.

Channel Stevedoring & Wharf Co., New York, has been incorporated with $20,000 capital by C. F. Terrence, J. P. Terrence and W. F. Terrence. L. B. Donahue, 27 William street, is attorney.

Marine Rapid Transit Co., New York, has increased its capital from $250,000 to $500,000.

Dawn Boat & Ship Building Co., New York, has changed its name to Dawn Boat Corp.

Frontoer Steamship Corp., Buffalo, has been incorporated with $100,000 capital by J. H. Gallagher, T. H. Hanrahan, and J. L. Keogh. T. C. Burke, Buffalo, is attorney.

Midland & Red Bank Steamship Co., Jersey City, N. J., has been incorporated with 500 shares no par value by Samuel M. Coombs Jr., Howard C. Gilmour and Henry A. Oetjen. McDermott, Enright & Carpenter, Jersey City, are attorneys.

Port Newark & New England Steamship Co., Newark, N. J., has been incorporated with $500,000 capital and 40,000 shares no par value by Louis F. Dodd, Charles Manshel, Herbert S. Egal and Charles F. Lynch, Newark.

Holmes Navigating Apparatus Co., New York, has increased its capital from 200 to 6000 shares, of which 1000 are $100 each and 5000 common, no par value.

American Lighterage Co., New York, has been incorporated with $10,000 capital by J. Tilney and J. V. Petrie, 15 Moore street.

Noland Steamship Co., Damatis arcade, will establish steamship service between Newport News, Va., and West Palm Beach, Fla., by the Nolco line.

Louisiana-Arkansas Barge Service, Inc. has been incorporated at Monroe, La., with $100,000 capital, by W. H. Johnson, 744 Wilkinson street, Shreveport, La.

Louisiana-Arkansas Barge Service Inc., has been incorporated at Monroe, La., by H. R. Noble, 2902 Central boulevard, Shreveport, La.

Harbor Towing & Transportation Co. has been incorporated at Houston, Tex., with $45,000 capital by G. H. Roberts, 2605 Yale street.

Harbor Towing & Transportation Co. has been incorporated at Houston, Tex., with $45,000 capital by G. H. Roberts, 2605 Yale street, and assocates.

Cowles Barge Line has been incorporated at Buffalo, N. Y., with $10,000 capital, by W. G. Fox and B. L. Cowler. J. A. Stone, Buffalo, is correspondent.

Engstrand Marine Propeller has been incorporated with $75,000 capital at Brooklyn, N. Y., by G. D. Engstrand and B. Austin. C. J. Pearson, 68 William street, New York, is attorney.

O. J. T. Towing & Transportation Co. has been incorporated at New York with $20,000 capital by O. O. Odegaard, O. Jensen and H. Tellefsen. F. H. Innes, St. George, S. I., is attorney.